Airwell

Service Manual

SX DCI Series

Indoor Units	Outdoor Units
SX 9 DCI	GC 9 DCI
SX 12 DCI	GC 12 DCI
SX 18 DCI	GC 18 DCI
SX 24 DCI	GC 24 DCI
SX 30 DCI	GC 30 DCI

REFRIGERANT

R410A

HEAT PUMP

SM SX DCI 1-A.3 GB

AUGUST – 2008

CONTENT

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1. INTRODUCTION

1.1 General

The **SX** split ceiling mounted range comprise RC (heat pump) models, as follows:

- **Heat Pump SX 9, SX 12, SX 18, SX 24, SX 30**.

1.2 Main Features

The **SX** series benefits from the most advanced technological innovations, namely:

- DC Inverter Technology R410A models.
- High COP.
- Low indoor and outdoor noise levels.
- Microprocessor control.
- Infrared remote control with LED.
- Easy access to the interconnecting tubing and wiring connections, main control panel can slide out for service .
- Automatic treated air sweep (by definition in NPR).
- Fresh Air & Distribution treated air to adjacent room.
- Indoor centrifugal fan.
- Easy installation and service.

1.3 Indoor Unit

The indoor unit is a floor/ ceiling mounted, and can be easily fitted to many types of residential and commercials applications.

It includes:

- Coil with hydrophilic aluminum fins.
- Motorized flaps (two step motors)
- Advanced electronic control box assembly (DCI storm)
- Mounting plate

1.4 Filtration

The SX series presents several types assembly (DCI storm).

- Easily accessible, and re-usable pre-filters (mesh).

1.5 Control

The microprocessor indoor controller, and an infrared remote control, supplied as standard, providing complete operating function and programming. For further details please refer to the Operation Manual, Appendix A.

1.6 Outdoor Unit

The **SX** outdoor units can be installed as floor or wall mounted units by using a wall supporting bracket. The metal sheets are protected by anti- corrosion paint work allowing long life resistance. All outdoor units are pre-charged. For further information please refer to the Product Data Sheet, Chapter 2.

It includes :

- Compressor mounted in a soundproofed compartment :

  Single Rotary – for SX 9 DCI and SX 12 DCI.

  Scroll – for SX 18 DCI.

  Twin Rotary – for SX 24 DCI and SX 30 DCI.

- Axial fan.
- Outdoor coil with hydrophilic louver fins for RC units.
- Outlet air fan grill.
- Service valves" flare" type connection.
- Interconnecting wiring terminal block.

1.7 Tubing Connections

Flare type interconnecting tubing to be produced on site.
For further details please refer to the Installation Manual, Chapter 10tttvv.

1.8 Accessories

RCW Wall Mounted Remove Control

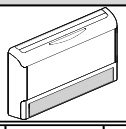
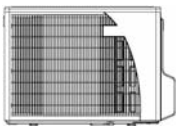
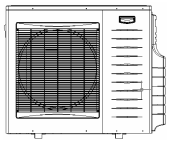
The RCW remote control is mounted on the wall, and controls the unit either as an infrared remote control or as a wired controller.The wired controller can control up to 10 indoor units with the same program settings and adjustment.
For further details please refer to the Technical Service Manual

1.9 Inbox Documentation

Each unit is supplied with its own installation and operation manuals.

1.10 Matching Table

1.10.1 R410A

OUTDOOR UNITS			INDOOR UNITS				
							
MODEL		REFRIGER.	SX 9	SX 12	SX 18	SX 24	SX 30
	GC 9-12-18	R410A	√	√	√		
	GC 24-30	R410A				√	√

The above table lists outdoor units and SX DCI indoor units which can be matched together.
In addition the listed outdoor units can be matched with other types of indoor units such as cassettes and wall mounted.
For further information please refer to the relevant Service Manual.

2. PRODUCT DATA SHEET

2.1 SX 9 DCI R410A

Model Indoor Unit				**SX 9 DCI**	
Model Outdoor Unit				**GC 9 DCI**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	8530(4780~12280)	10920(5120~15350)
			kW	2.5(1.4-3.6)	3.2(1.5~4.5)
Power input (1)			kW	0.62(0.42-1.1)	0.93(0.4~1.6)
EER (Cooling) or COP(Heating) (1)			W/W	4.03	3.41
Energy efficiency class				A	B
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	2.7	4.1
Starting current			A	10.5	
Circuit breaker rating			A	35	
INDOOR	Fan type & quantity			Centrifugal x 2	
	Fan speeds	H/M/L	RPM	760/670/500	
	Air flow (2)	H/M/L	m3/hr	400/350/300	
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	50/49/47	
	Sound pressure level (4)	H/M/L	dB(A)	39/37/35	
	Moisture removal		l/hr	1	
	Condenstate drain tube I.D		Mm	16	
	Dimensions	WxDxH	Mm	820*190*630	
	Weight		Kg	21	
	Package dimensions	WxDxH	Mm	890*280*710	
	Package weight		Kg	25	
	Units per pallet		Units	14units per pallet	
	Units stacking		Units	7 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Single Rotary,DC Inverter,Panasonic 5RS102XAB	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	830	
	Air flow	H/L	m3/hr	1780	
	Sound power level	H/L	dB(A)	61	
	Sound pressure level (4)	H/L	dB(A)	51	
	Dimensions	WxDxH	Mm	795*290*610	
	Weight		Kg	38	
	Package dimensions	WxDxH	Mm	945*395*655	
	Packaged weight		Kg	42	
	Units per pallet		Units	9	
	Stacking height		Units	3 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	1.10kg/7.5m	
	Additional charge per 1 meter		g/m	No Need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	3/8"(9.53)	
		Max.tubing length	m.	Max.20	
		Max.height difference	m.	Max.10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.2 SX 12 DCI R410A

Model Indoor Unit				**SX 12 DCI**	
Model Outdoor Unit				**GC 12 DCI**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	11940(5120~15010)	14330(5120~17060)
			kW	3.5(1.5-4.4)	4.2(1.5~5.0)
Power input (1)			kW	0.98(0.46-1.3)	1.31(0.35~1.58)
EER (Cooling) or COP(Heating) (1)			W/W	3.57	3.21
Energy efficiency class				A	C
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	4.3	5.7
Starting current			A	10.5	
Circuit breaker rating			A	35	
INDOOR	Fan type & quantity			Centrifugal x 2	
	Fan speeds	H/M/L	RPM	830/760/500	
	Air flow (2)	H/M/L	m3/hr	450/400/300	
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	56/53/51	
	Sound pressure level (4)	H/M/L	dB(A)	45/41/38	
	Moisture removal		l/hr	1.5	
	Condenstate drain tube I.D		Mm	16	
	Dimensions	WxDxH	Mm	820*190*630	
	Weight		Kg	22	
	Package dimensions	WxDxH	Mm	890*280*710	
	Package weight		kg	26	
	Units per pallet		units	14units per pallet	
	Units stacking		units	7 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Single Rotary,DC Inverte Panasonic 5RS102XAB	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	830	
	Air flow	H/L	m3/hr	1780	
	Sound power level	H/L	dB(A)	62	
	Sound pressure level (4)	H/L	dB(A)	52	
	Dimensions	WxDxH	mm	795*290*610	
	Weight		kg	38.5	
	Package dimensions	WxDxH	mm	945*395*655	
	Packaged weight		kg	42.5	
	Units per pallet		Units	9	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	1.20kg/7.5m	
	Additional charge per 1 meter		g/m	No Need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	3/8"(9.53)	
		Max.tubing length	m.	Max.20	
		Max.height difference	m.	Max.10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.3 SX 18 DCI R410A

Model Indoor Unit				**SX 18 DCI**	
Model Outdoor Unit				**GC 18 DCI**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	17000(5120-20460)	20460(5120-24550)
			kW	5.0(1.5-6.0)	5.8(1.5~7.2)
Power input (1)			kW	1.65(0.5-2.1)	1.69(0.45-2.1)
EER (Cooling) or COP(Heating) (1)			W/W	3.03	3.43
Energy efficiency class				B	B
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	7.2	7.7
Starting current			A	10.5	
Circuit breaker rating			A	35	
INDOOR	Fan type & quantity			Centrifugal x 2	
	Fan speeds	H/M/L	RPM	1050/950/700	
	Air flow (2)	H/M/L	m3/hr	870/750/600	
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	65/60/56	
	Sound pressure level (4)	H/M/L	dB(A)	51/48/45	
	Moisture removal		l/hr	2	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxDxH	mm	1200*190*630	
	Weight		kg	30	
	Package dimensions	WxDxH	mm	1270*280*710	
	Package weight		kg	35	
	Units per pallet		units	7units per pallet	
	Units stacking		units	7 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Scroll compressor 5CS130XCC03	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	920	
	Air flow	H/L	m3/hr	2160	
	Sound power level	H/L	dB(A)	63	
	Sound pressure level (4)	H/L	dB(A)	53	
	Dimensions	WxDxH	mm	795*290*610	
	Weight		kg	39	
	Package dimensions	WxDxH	mm	945*395*655	
	Packaged weight		kg	43	
	Units per pallet		Units	9	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	1.50kg/7.5m	
	Additional charge per 1 meter		g/m	No Need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	1/2"(12.7)	
		Max.tubing length	m.	Max.30	
		Max.height difference	m.	Max.10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.4 SX 24 DCI R410A

Model Indoor Unit				**SX 24 DCI**	
Model Outdoor Unit				**GC 24 DCI**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	23200(5120~25590)	25910(5110-30000)
			kW	6.80(1.50-7.60)	7.60(1.60~8.60)
Power input (1)			kW	2.25(0.50-2.68)	2.05(05~2.30)
EER (Cooling) or COP(Heating) (1)			W/W	3.02	3.61
Energy efficiency class				B	A
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	10.1	9.6
Starting current			A	15	
Circuit breaker rating			A	45	
INDOOR	Fan type & quantity			Centrifugal x 2	
	Fan speeds	H/M/L	RPM	1300/1200/1050	
	Air flow (2)	H/M/L	m3/hr	1020/930/760	
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	67/64/60	
	Sound pressure level (4)	H/M/L	dB(A)	56/53/49	
	Moisture removal		l/hr	2.5	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1200x630x190	
	Weight		kg	32	
	Package dimensions	WxHxD	mm	1270x710x280	
	Packaged weight		kg	36	
	Units per pallet		units	7	
	Stacking height		units	7	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Two Rotary,Mitsubishi TNB220F	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	850	
	Air flow	H/L	m3/hr	3600	
	Sound power level	H/L	dB(A)	66	
	Sound pressure level (4)	H/L	dB(A)	56	
	Dimensions	WxHxD	mm	950*340*835	
	Weight		kg	65.5	
	Package dimensions	WxHxD	mm	1087x477x910	
	Packaged weight		kg	70	
	Units per pallet		Units	2	
	Stacking height		units	2 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	2.4/7.5	
	Additional charge per 1 meter		g/m	No Need	
	Connections between units	Liquid line	In.(mm)	3/8”(9.53)	
		Suction line	In.(mm)	5/8”(15.88)	
		Max.tubing length	m.	Max.30	
		Max.height difference	m.	Max.15	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.5 SX 30 DCI R410A

Model Indoor Unit				**SX 30 DCI**	
Model Outdoor Unit				**GC 30 DCI**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	25570(6820-32390)	30000(5110-35800)
			kW	7.5(1.6-8.6)	8.4(1.8-9.8)
Power input (1)			kW	2.49(0.5-3.1)	2.46(0.5-2.8)
EER (Cooling) or COP(Heating) (1)			W/W	3.01	3.41
Energy efficiency class				B	B
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	11.3	11.0
Starting current			A	15	
Circuit breaker rating			A	45	
INDOOR	Fan type & quantity			Centrifugal x 2	
	Fan speeds	H/M/L	RPM	1300/1200/1050	
	Air flow (2)	H/M/L	m3/hr	1020/930/760	
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	67/64/60	
	Sound pressure level (4)	H/M/L	dB(A)	56/53/49	
	Moisture removal		l/hr	2.9	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1200x630x190	
	Weight		kg	32	
	Package dimensions	WxHxD	mm	1270x710x280	
	Packaged weight		kg	36	
	Units per pallet		units	7	
	Stacking height		units	7	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Two Rotary,Mitsubishi TNB220F	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	850	
	Air flow	H/L	m3/hr	3600	
	Sound power level	H/L	dB(A)	66	
	Sound pressure level (4)	H/L	dB(A)	56	
	Dimensions	WxHxD	mm	950*340*835	
	Weight		kg	66	
	Package dimensions	WxHxD	mm	1087x477x910	
	Packaged weight		kg	70	
	Units per pallet		Units	2	
	Stacking height		units	2 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	2.75/7.5	
	Additional charge per 1 meter		g/m	No Need	
	Connections between units	Liquid line	In.(mm)	3/8”(9.53)	
		Suction line	In.(mm)	5/8”(15.88)	
		Max.tubing length	m.	Max.30	
		Max.height difference	m.	Max.15	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

3. RATING CONDITIONS

Standard conditions in accordance with ISO 5151, ISO 13253 (for ducted units) and EN 14511.

Cooling:
Indoor: 27°C DB 19°C WB
Outdoor: 35 °C DB

Heating:
Indoor: 20°C DB
Outdoor: 7°C DB 6°C WB

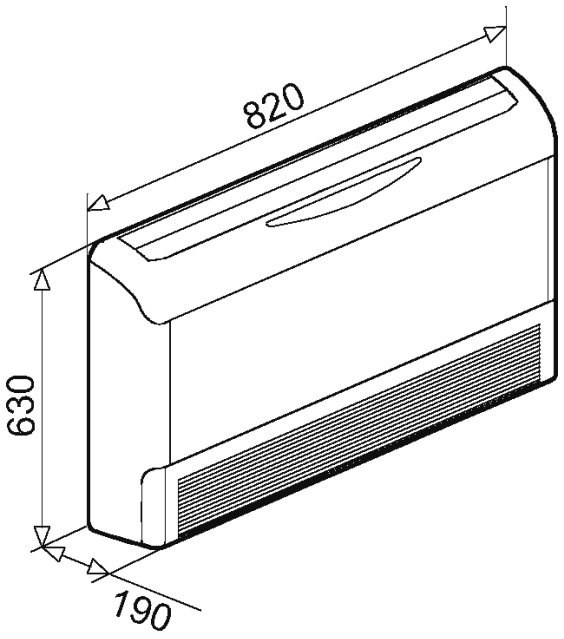
3.1 Operating Limits

R410A

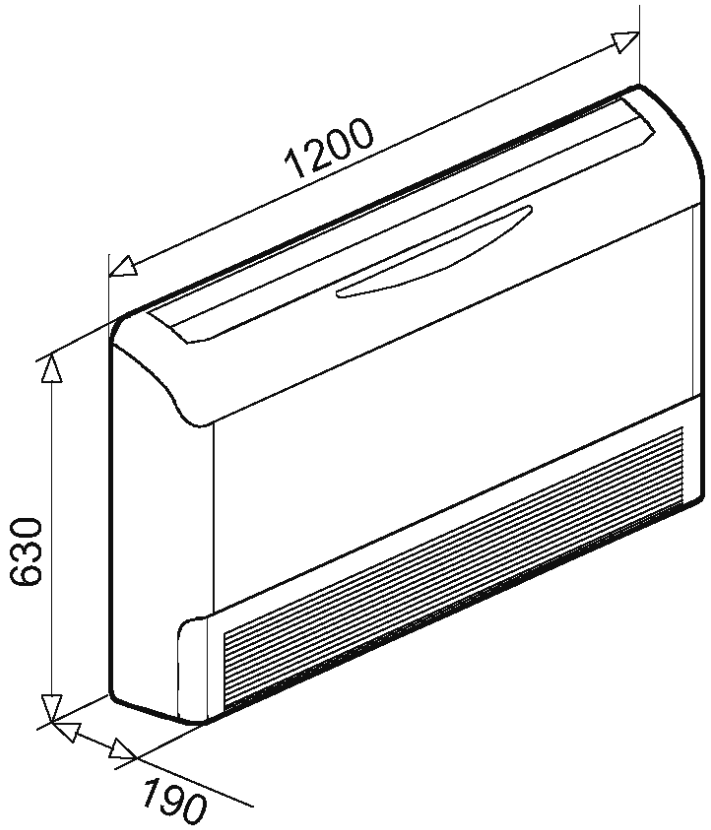
		Indoor	Outdoor
Cooling	Upper limit	32°C DB 23°C WB	46°C DB
	Lower limit	21°C DB 15°C WB	-10°C DB
Heating	Upper limit	27°C DB	24°C DB 18°C WB
	Lower limit	10°C DB	-15°C DB -16°C WB
Voltage	1PH	198 – 264 V	
	3PH	N/A	

4. OUTLINE DIMENSIONS

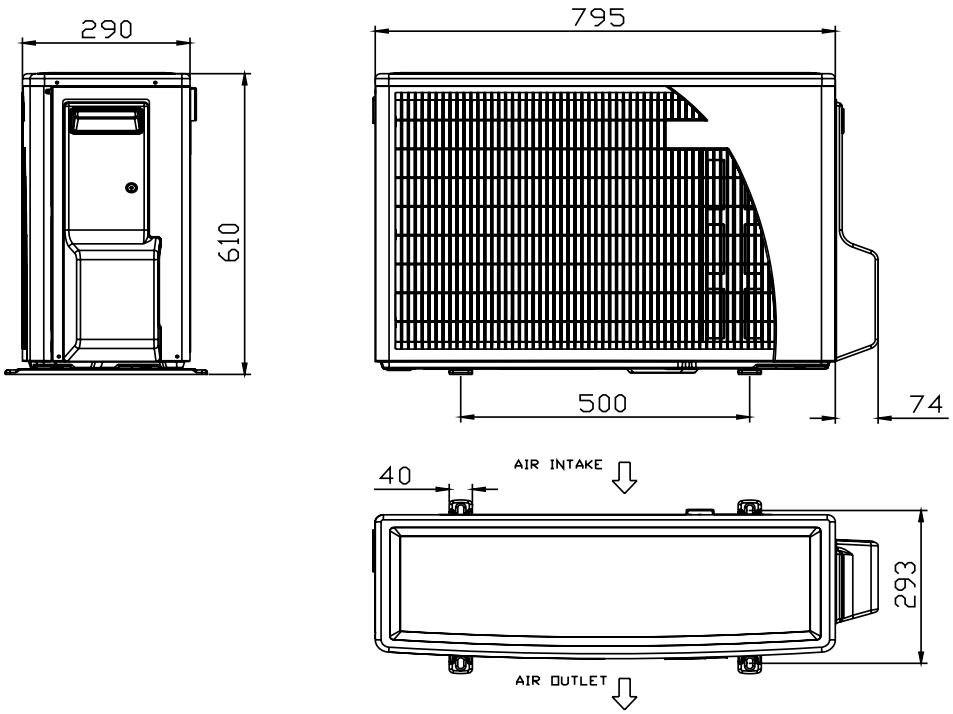
4.1 Indoor Unit: SX 9, 12 DCI



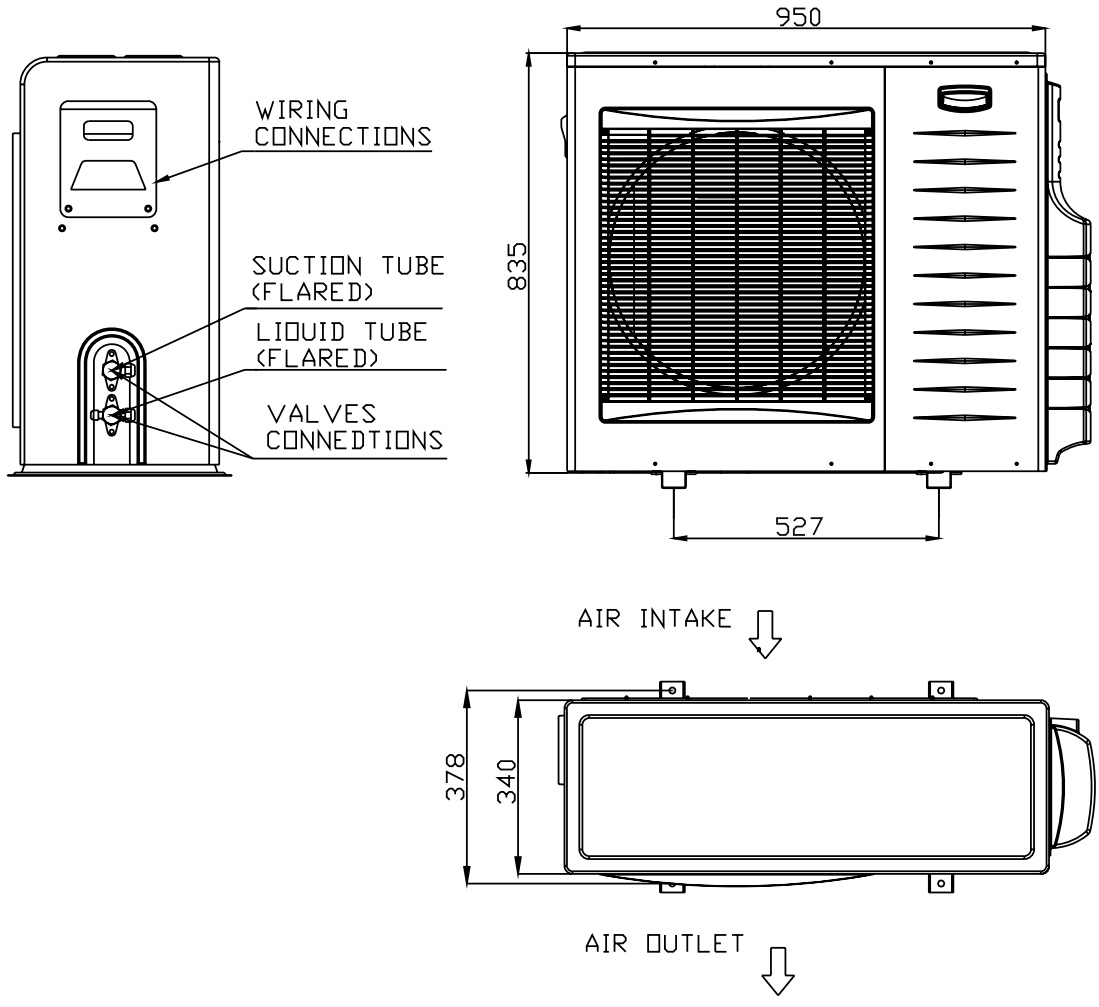
4.2 Indoor Unit: SX 18, 24, 30 DCI



4.3 Outdoor Unit: GC 9, 12, 18 DCI



4.4 Outdoor Unit: GC 24, 30 DCI



5. PERFORMANCE DATA

5,1 SX 9 DCI

5.1.1 Cooling Capacity (kW) – Run Mode

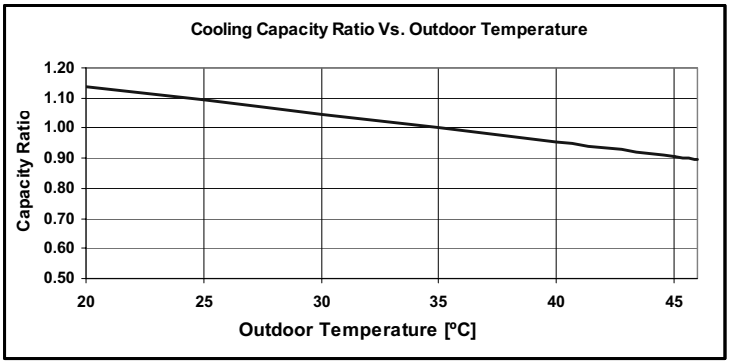
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB/WB TEMPERATURE [°C]				
OU COIL ENTERING AIR DB TEMPERATURE [°C]	**DATA**	**22/15**	**24/17**	**27/19**	**29/21**	**32/23**
-10 - 20 (protection range)	**TC**	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	**TC**	2.42	2.57	2.73	2.89	3.05
	SC	2.09	2.13	2.18	2.22	2.26
	PI	0.49	0.50	0.51	0.52	0.52
30	**TC**	2.30	2.46	2.62	2.77	2.93
	SC	2.04	2.08	2.12	2.17	2.21
	PI	0.54	0.55	0.56	0.57	0.58
35	**TC**	2.18	2.34	**2.50**	2.66	2.82
	SC	1.98	2.03	**2.07**	2.11	2.16
	PI	0.60	0.61	**0.62**	0.63	0.64
40	**TC**	2.07	2.23	2.38	2.54	2.70
	SC	1.93	1.97	2.02	2.06	2.10
	PI	0.66	0.67	0.68	0.69	0.70
46	**TC**	1.93	2.09	2.24	2.40	2.56
	SC	1.87	1.91	1.95	2.00	2.04
	PI	0.73	0.74	0.75	0.75	0.76

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.1.2 Capacity Correction Factors



5.1.3 Heating Capacity (kW) - Run Mode

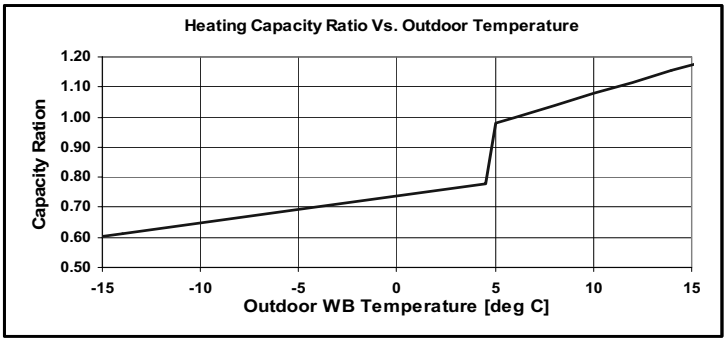
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [°C]		
OU COIL ENTERING AIR DB/WB TEMPERATURE [°C]	**DATA**	**15**	**20**	**25**
-15/-16	**TC**	2.04	1.89	1.75
	PI	0.56	0.61	0.67
-10/-12	**TC**	2.27	2.12	1.98
	PI	0.67	0.73	0.79
-7/-8	**TC**	2.44	2.30	2.16
	PI	0.76	0.82	0.87
-1/-2	**TC**	2.53	2.38	2.24
	PI	0.80	0.86	0.92
2/1	**TC**	2.58	2.44	2.30
	PI	0.83	0.89	0.94
7/6	**TC**	3.34	**3.20**	3.06
	PI	0.87	**0.93**	0.99
10/9	**TC**	3.53	3.38	3.24
	PI	0.93	0.98	1.04
15/12	**TC**	3.71	3.57	3.43
	PI	0.98	1.03	1.09
15-24 (Protection Range)	**TC**	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

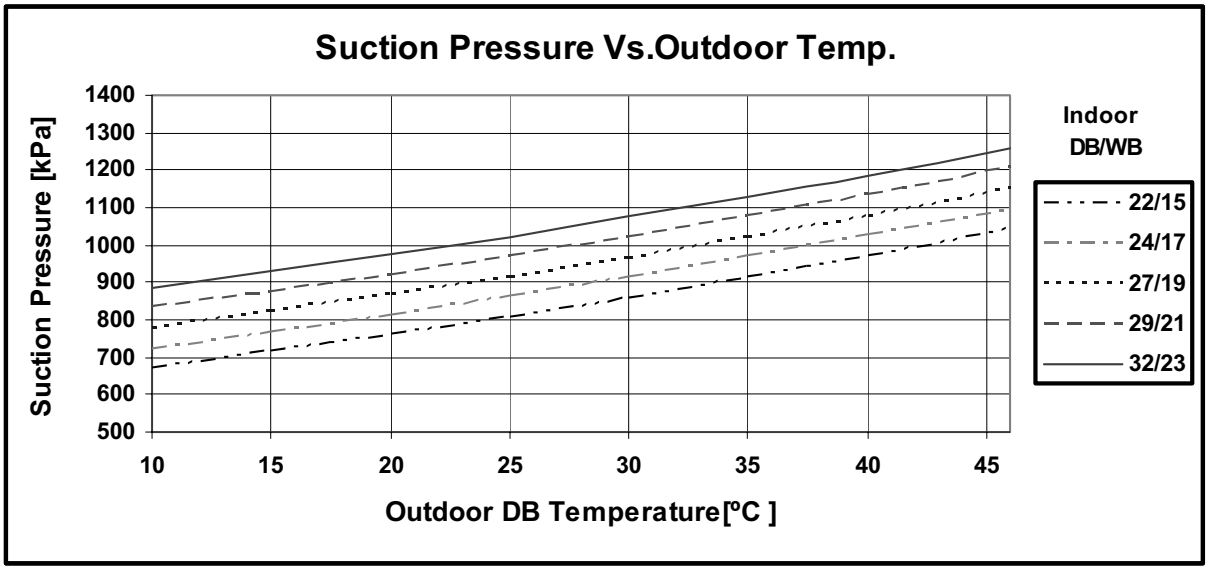
LEGEND

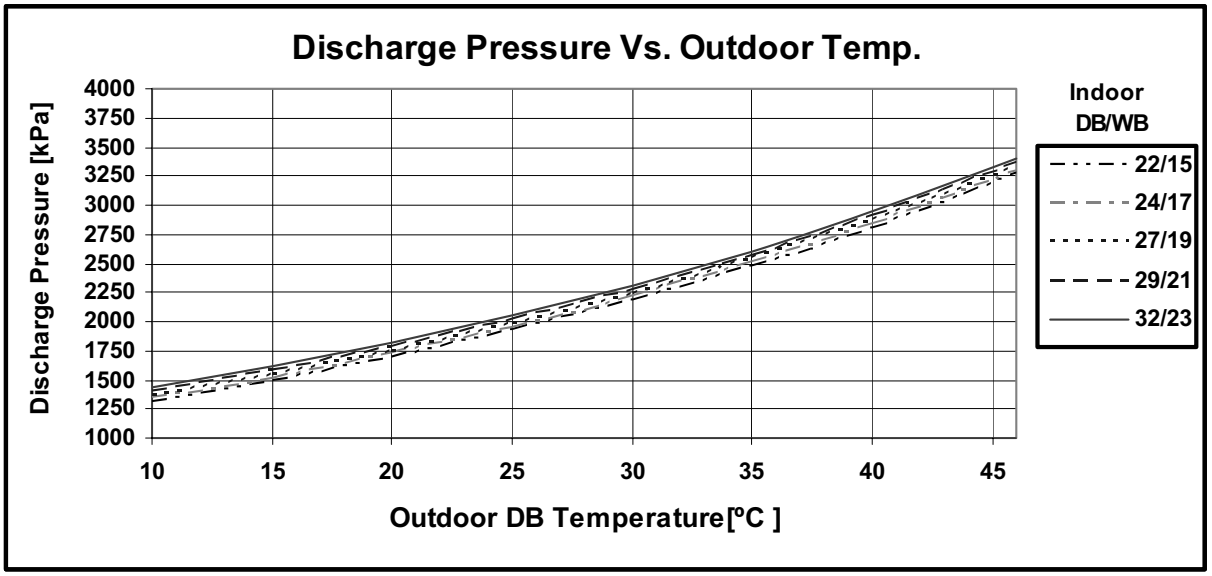
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.1.4 Capacity Correction Factors

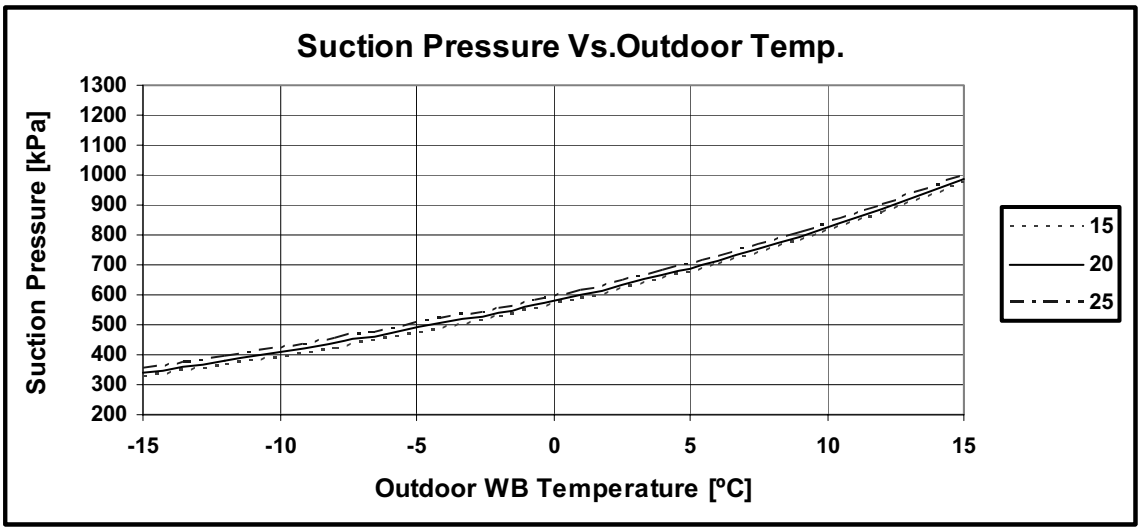


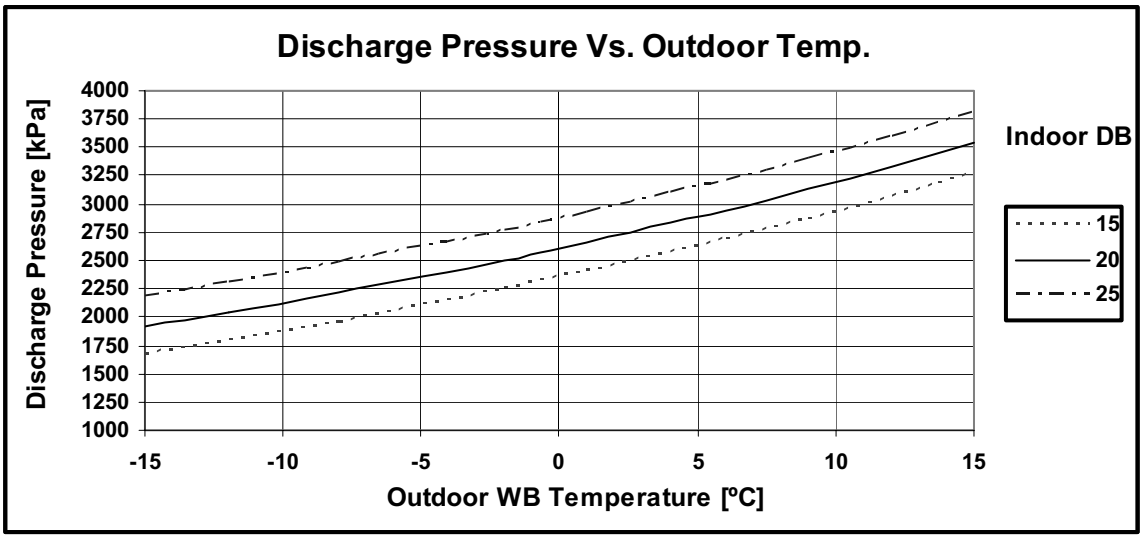
5.1.5 Model: SX 9 DCI Cooling – Test Mode





5.1.6 Heating – Test Mode





5.2 SX 12 DCI

5.2.1 Cooling Capacity (kW) - Run Mode

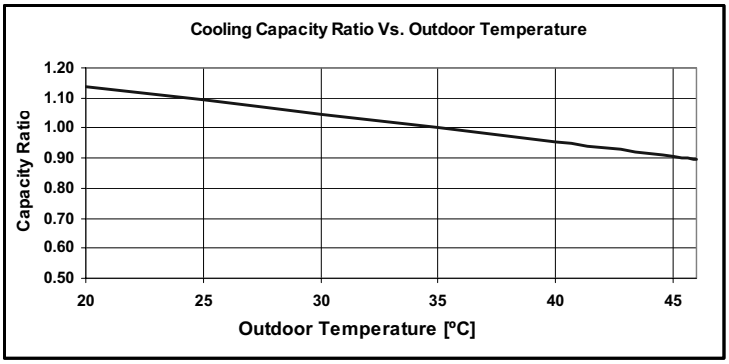
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB/WB TEMPERATURE [°C]				
OU COIL ENTERING AIR DB TEMPERATURE [°C]	**DATA**	**22/15**	**24/17**	**27/19**	**29/21**	**32/23**
-10 - 20 (protection range)	**TC**	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	**TC**	3.38	3.60	3.83	4.05	4.27
	SC	2.65	2.70	2.75	2.81	2.86
	PI	0.77	0.78	0.80	0.81	0.83
30	**TC**	3.22	3.44	3.66	3.88	4.11
	SC	2.58	2.63	2.69	2.74	2.79
	PI	0.86	0.88	0.89	0.90	0.92
35	**TC**	3.06	3.28	**3.50**	3.72	3.94
	SC	2.51	2.57	**2.62**	2.67	2.73
	PI	0.95	0.97	**0.98**	0.99	1.01
40	**TC**	2.89	3.12	3.34	3.56	3.78
	SC	2.45	2.50	2.55	2.61	2.66
	PI	1.04	1.06	1.07	1.08	1.10
46	**TC**	2.70	2.92	3.14	3.36	3.58
	SC	2.37	2.42	2.47	2.53	2.58
	PI	1.15	1.16	1.18	1.19	1.21

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.2.2 Capacity Correction Factor



5.2.3 Heating Capacity (kW) - Run Mode

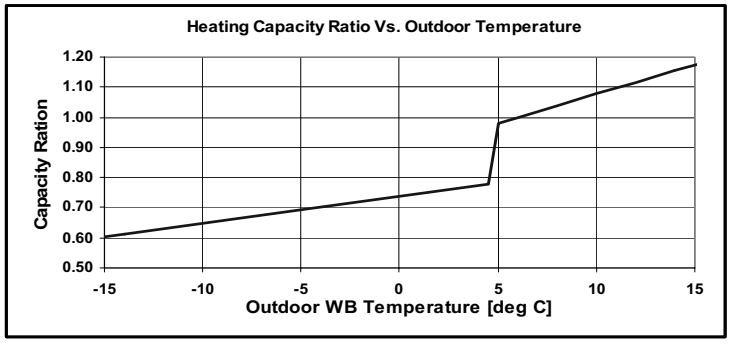
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [°C]		
OU COIL ENTERING AIR DB/WB TEMPERATURE [°C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	2.67	2.49	2.30
	PI	0.79	0.87	0.95
-10/-12	TC	2.98	2.79	2.60
	PI	0.95	1.03	1.11
-7/-8	TC	3.20	3.02	2.83
	PI	1.07	1.15	1.23
-1/-2	TC	3.32	3.13	2.94
	PI	1.13	1.21	1.29
2/1	TC	3.39	3.20	3.02
	PI	1.17	1.25	1.33
7/6	TC	4.39	**4.20**	4.01
	PI	1.23	**1.31**	1.39
10/9	TC	4.63	4.44	4.26
	PI	1.30	1.38	1.46
15/12	TC	4.87	4.68	4.50
	PI	1.38	1.46	1.54
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

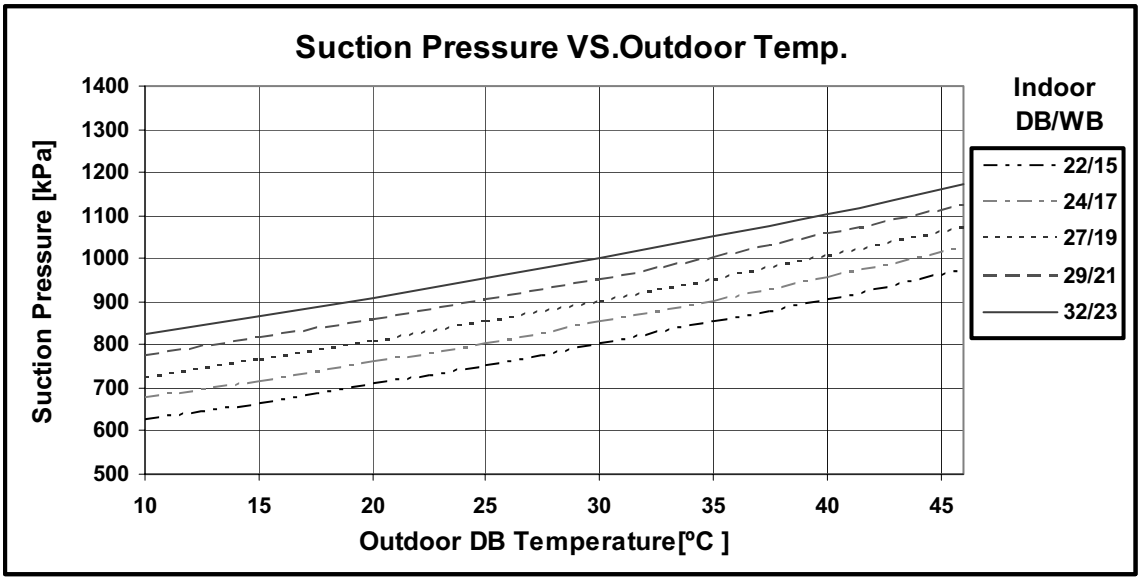
LEGEND

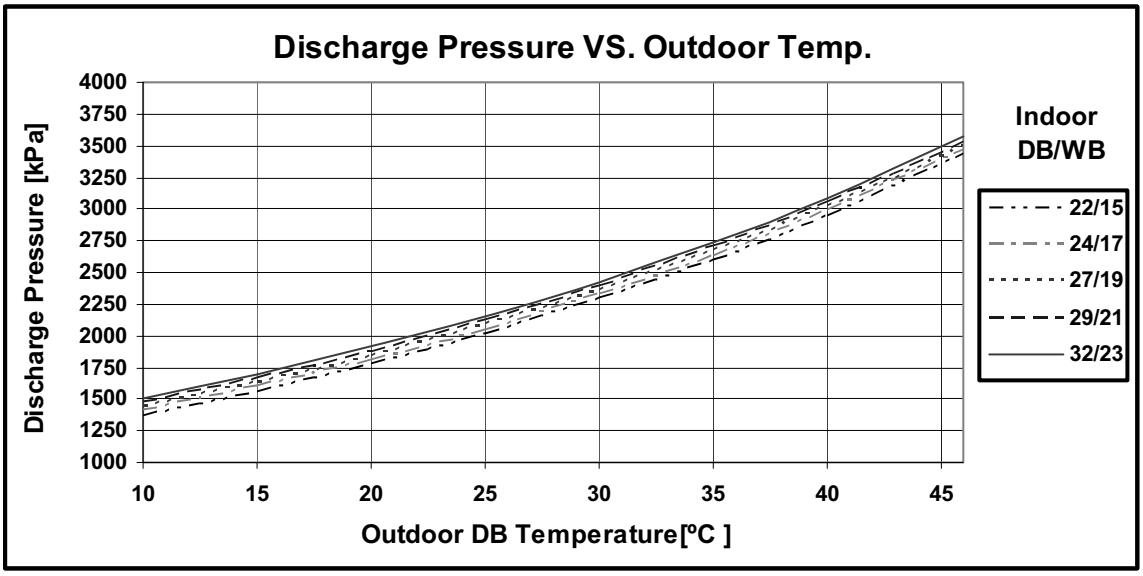
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.2.4 Capacity Correction Factors

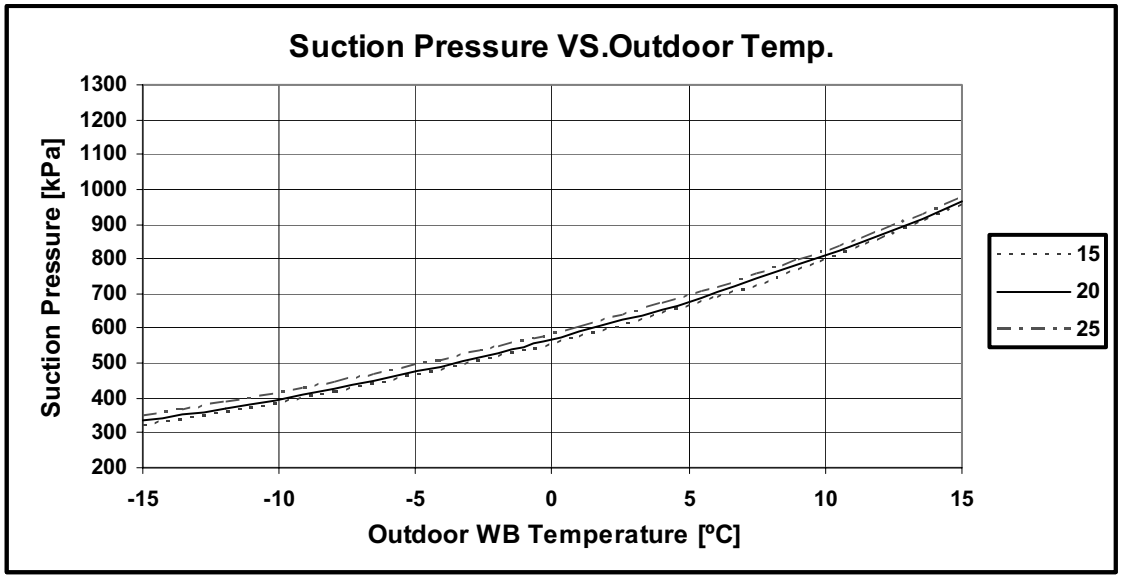


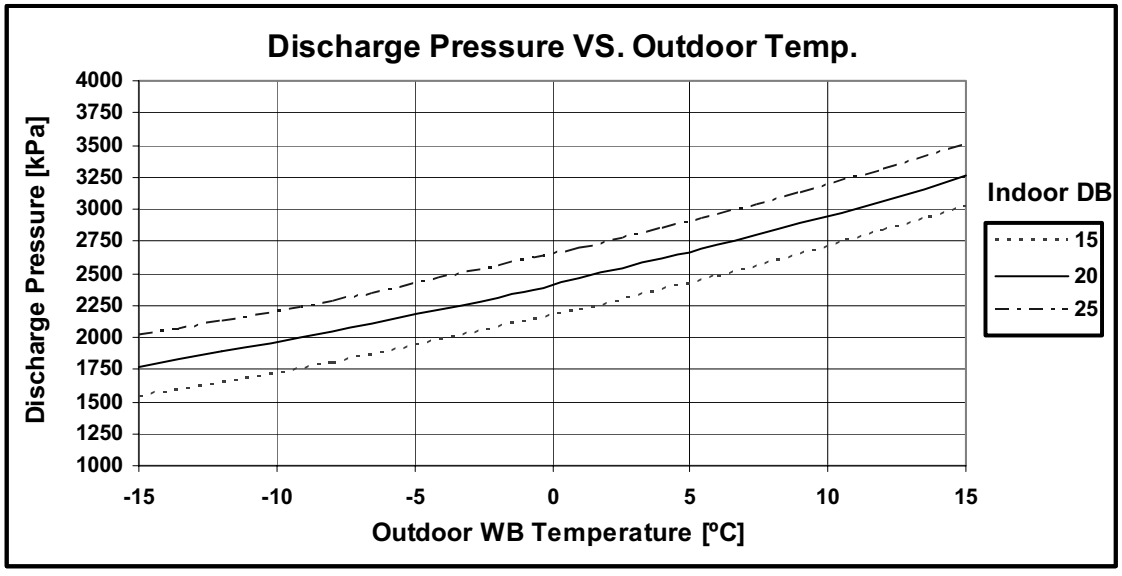
5.2.5 Model: SX 12 DCI Cooling – Test Mode





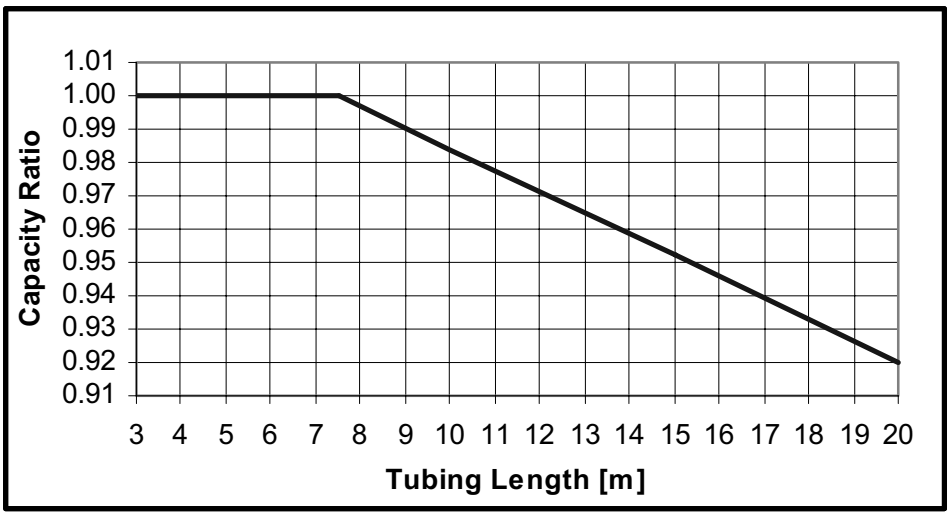
5.2.6 Heating – Test Mode



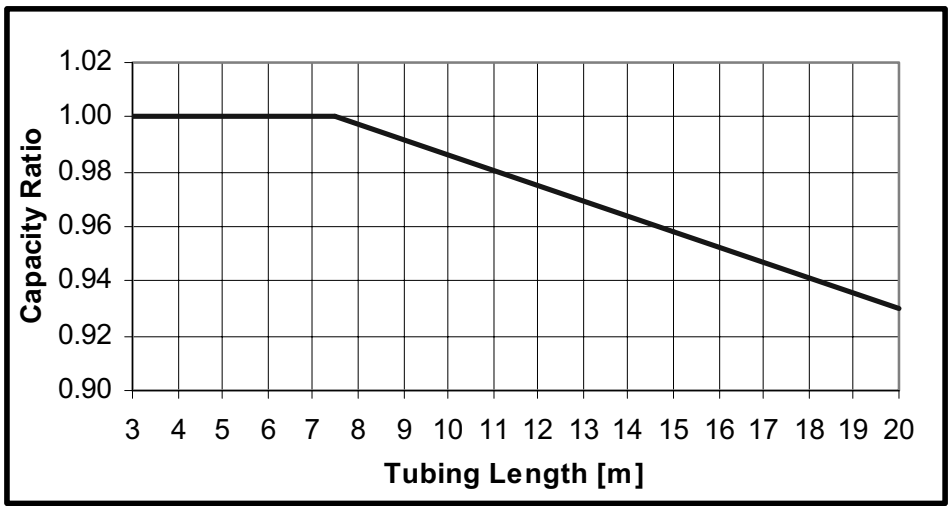


5.3 Capacity Correction Factor Due to Tubing Length

5.3.1 SX 9, 12 DCI :Cooling



5.3.2 Heating



5.4 SX18 DCI

5.4.1 Cooling Capacity (kW) - Run Mode

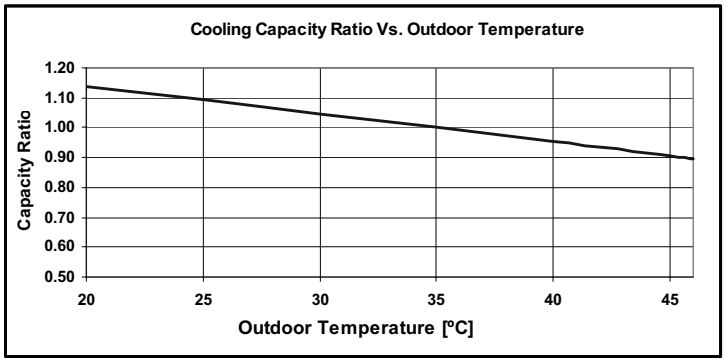
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB/WB TEMPERATURE [°C]				
OU COIL ENTERING AIR DB TEMPERATURE [°C]	**DATA**	**22/15**	**24/17**	**27/19**	**29/21**	**32/23**
-10 - 20 (protection range)	**TC**	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	**TC**	4.93	5.22	5.51	5.80	6.09
	SC	3.35	3.40	3.45	3.50	3.55
	PI	1.25	1.28	1.30	1.33	1.36
30	**TC**	4.67	4.96	5.25	5.54	5.83
	SC	3.22	3.27	3.32	3.37	3.42
	PI	1.42	1.45	1.48	1.50	1.53
35	**TC**	4.42	4.71	**5.00**	5.29	5.58
	SC	3.09	3.14	**3.19**	3.24	3.29
	PI	1.59	1.62	**1.65**	1.68	1.71
40	**TC**	4.17	4.46	4.75	5.04	5.33
	SC	2.96	3.01	3.06	3.11	3.16
	PI	1.77	1.80	1.82	1.85	1.88
46	**TC**	3.86	4.15	4.44	4.73	5.02
	SC	2.80	2.85	2.90	2.95	3.00
	PI	1.98	2.00	2.03	2.06	2.09

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.4.2 Capacity Correction Factors



5.4.3 Heating Capacity (kW) - Run Mode

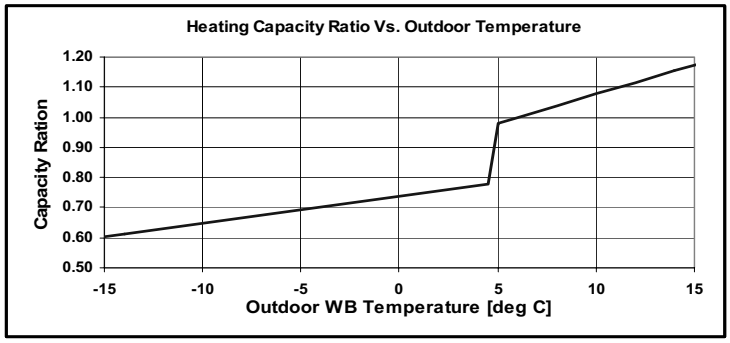
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [°C]		
OU COIL ENTERING AIR DB/WB TEMPERATURE [°C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	2.64	2.26	1.88
	PI	1.18	1.27	1.35
-10/-12	TC	3.48	3.10	2.72
	PI	1.34	1.42	1.50
-7/-8	TC	4.12	3.74	3.36
	PI	1.45	1.54	1.62
-1/-2	TC	4.43	4.05	3.67
	PI	1.51	1.59	1.68
2/1	TC	4.65	4.27	3.89
	PI	1.55	1.63	1.72
7/6	TC	6.18	**5.80**	5.42
	PI	1.61	**1.69**	1.77
10/9	TC	6.50	6.12	5.74
	PI	1.64	1.72	1.81
15/12	TC	6.82	6.44	6.06
	PI	1.67	1.75	1.84
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

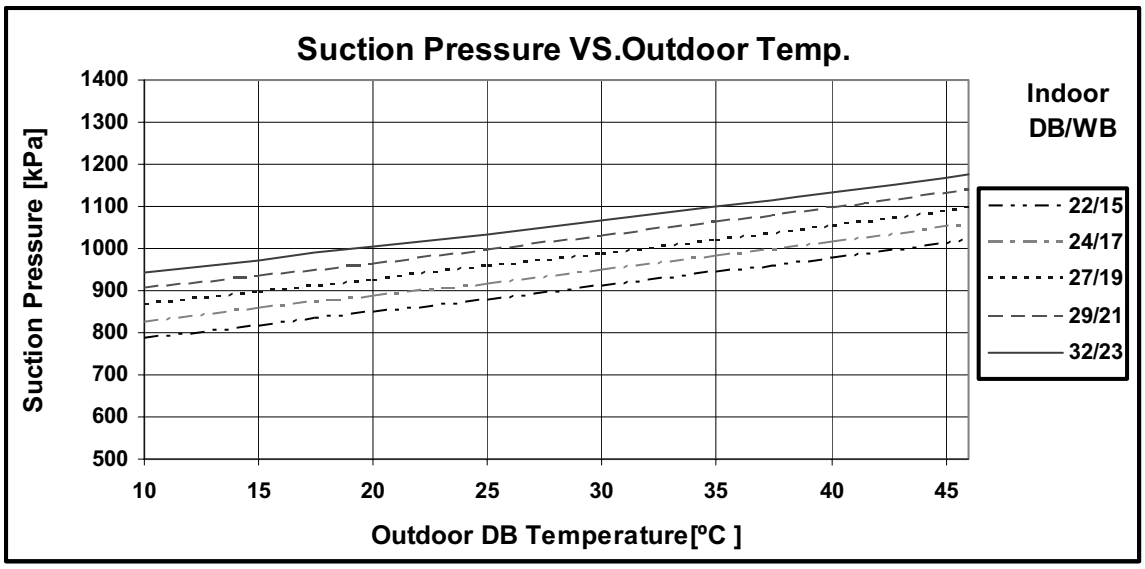
LEGEND

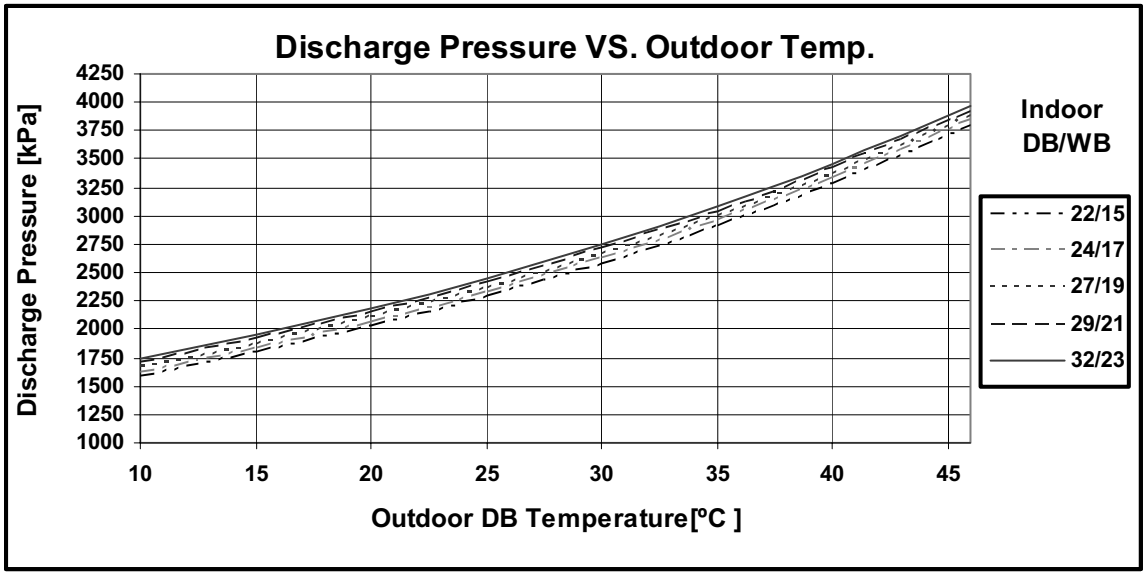
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.4.4 Capacity Correction Factors

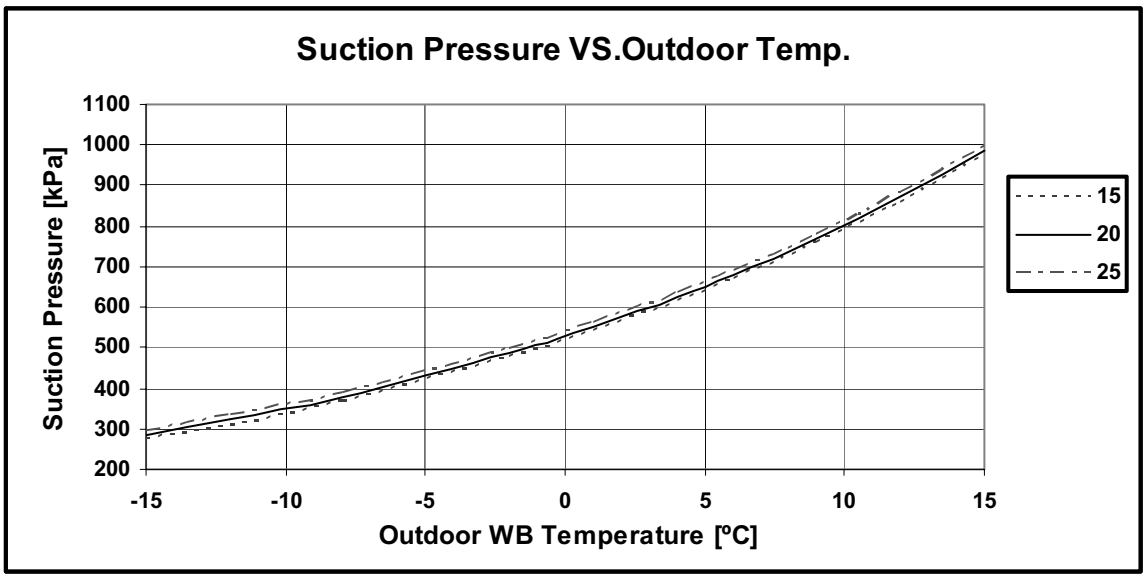


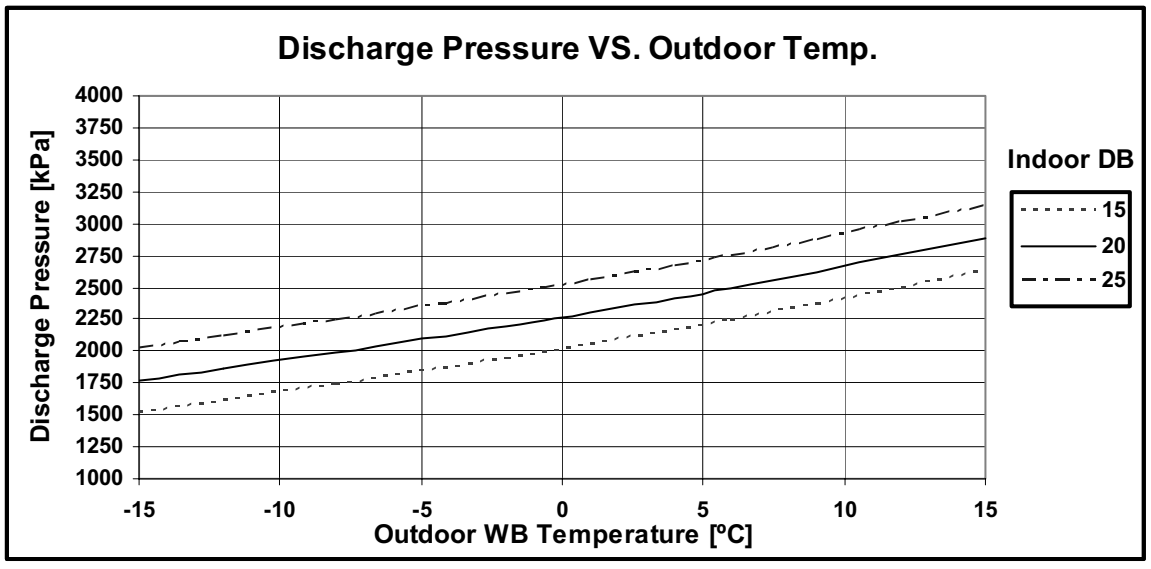
5.4.5 Model: SX 18 DCI Cooling – Test Mode





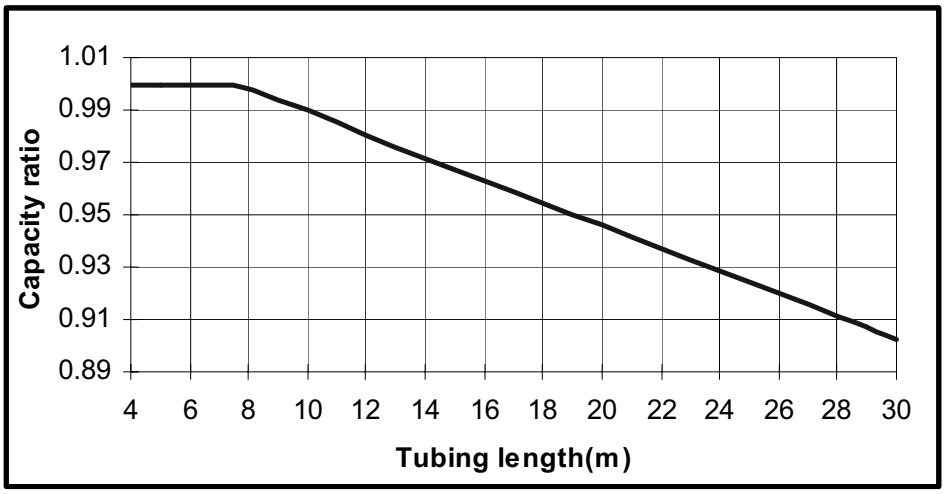
5.4.6 Heating – Test Mode



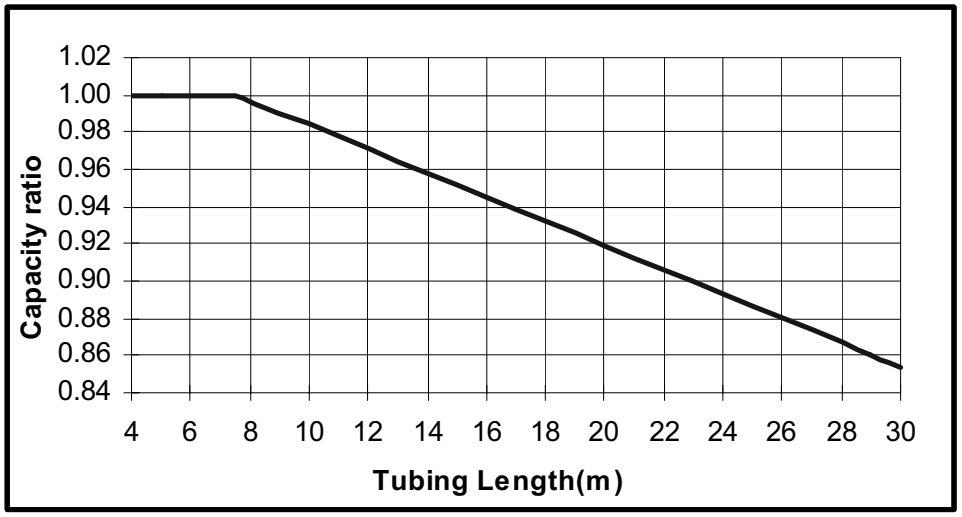


5.5 Capacity Correction Factor Due to Tubing Length

5.5.1 SX 18 DCI :Cooling



5.5.2 Heating



5.6 SX 24 DCI

5.6.1 Cooling Capacity (kW) - Run Mode

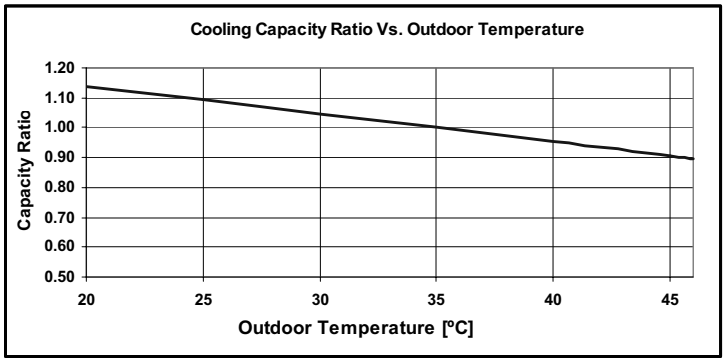
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB/WB TEMPERATURE [°C]				
OU COIL ENTERING AIR DB TEMPERATURE [°C]	**DATA**	**22/15**	**24/17**	**27/19**	**29/21**	**32/23**
-10 - 20 (protection range)	**TC**	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	**TC**	6.70	7.09	7.49	7.88	8.28
	SC	5.36	5.44	5.52	5.60	5.68
	PI	1.70	1.74	1.78	1.82	1.85
30	**TC**	6.35	6.75	7.14	7.54	7.93
	SC	5.15	5.23	5.31	5.39	5.47
	PI	1.94	1.98	2.01	2.05	2.09
35	**TC**	6.01	6.41	**6.80**	7.19	7.59
	SC	4.94	5.02	**5.10**	5.18	5.26
	PI	2.17	2.21	**2.25**	2.29	2.33
40	**TC**	5.67	6.06	6.46	6.85	7.25
	SC	4.73	4.81	4.89	4.97	5.05
	PI	2.41	2.45	2.49	2.52	2.56
46	**TC**	5.26	5.65	6.04	6.44	6.83
	SC	4.48	4.56	4.64	4.72	4.80
	PI	2.69	2.73	2.77	2.81	2.85

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.6.2 Capacity Correction Factors



5.6.3 Heating Capacity (kW) - Run Mode

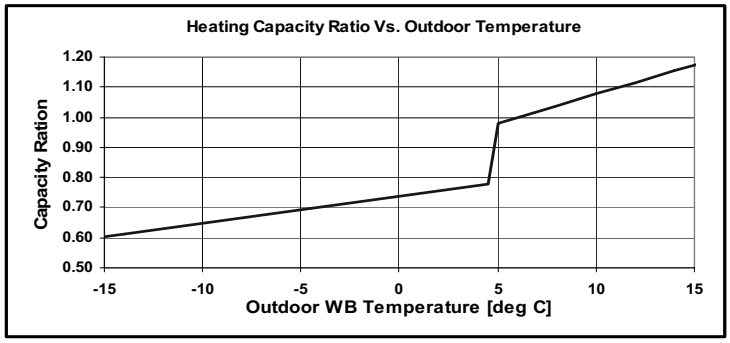
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [°C]		
OU COIL ENTERING AIR DB/WB TEMPERATURE [°C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	3.46	2.96	2.46
	PI	1.48	1.58	1.69
-10/-12	TC	4.57	4.07	3.57
	PI	1.67	1.77	1.88
-7/-8	TC	5.40	4.90	4.40
	PI	1.81	1.92	2.02
-1/-2	TC	5.81	5.31	4.81
	PI	1.88	1.99	2.10
2/1	TC	6.09	5.59	5.09
	PI	1.93	2.04	2.14
7/6	TC	8.10	**7.60**	7.10
	PI	2.00	**2.11**	2.22
10/9	TC	8.52	8.02	7.52
	PI	2.04	2.15	2.25
15/12	TC	8.94	8.44	7.94
	PI	2.08	2.19	2.29
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

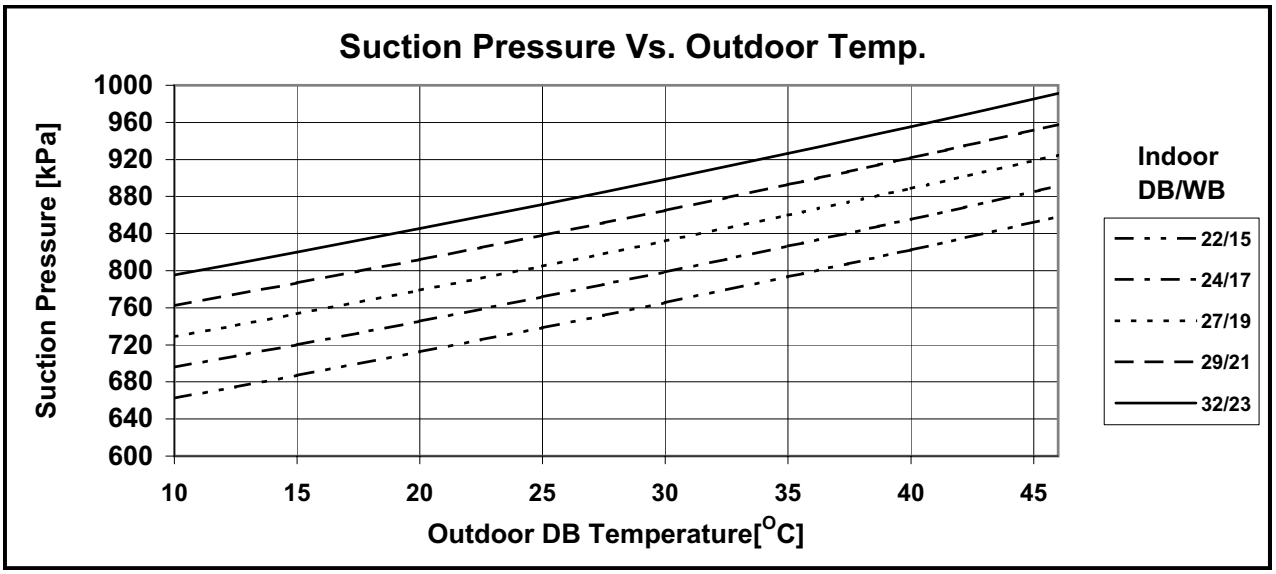
LEGEND

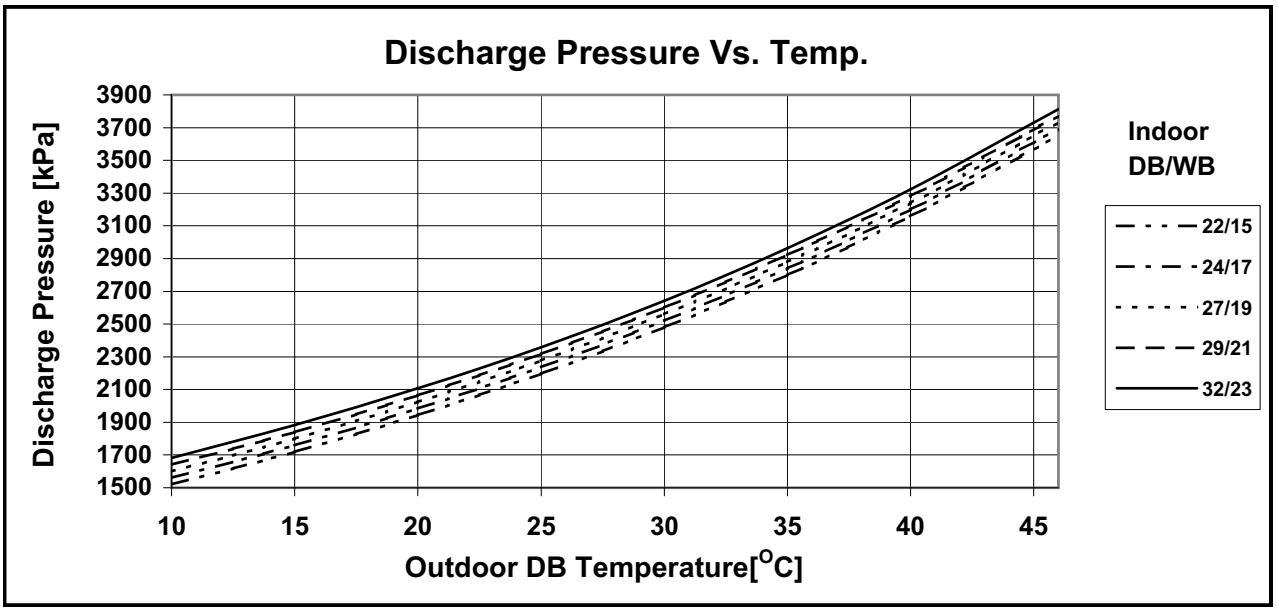
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.6.4 Capacity Correction Factors

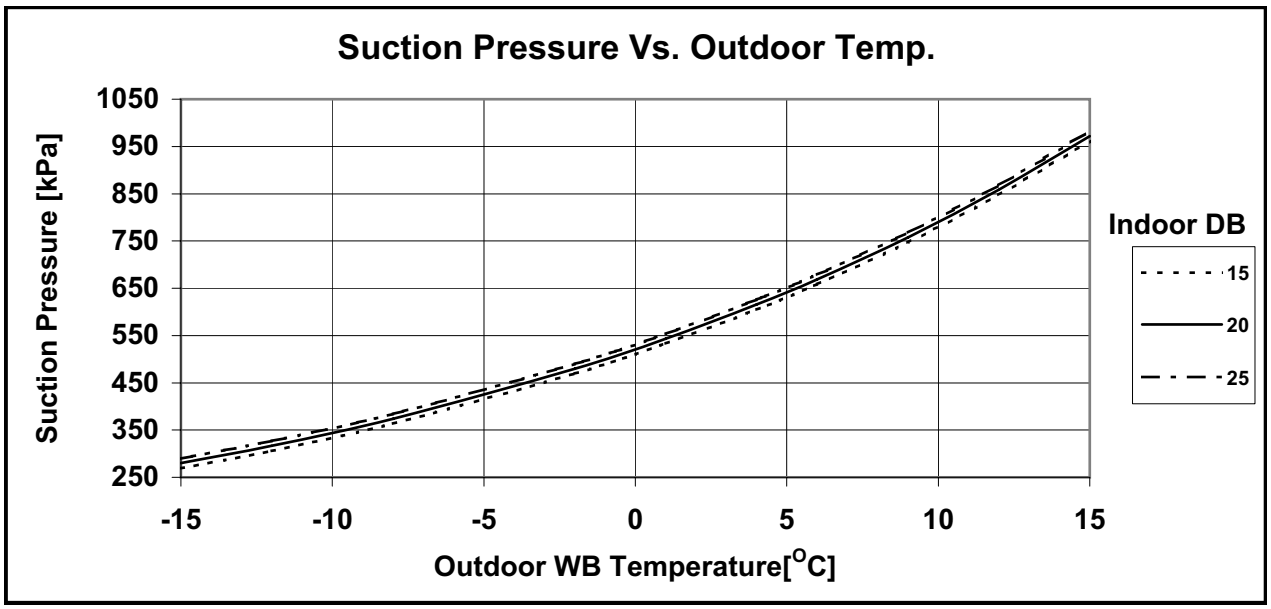


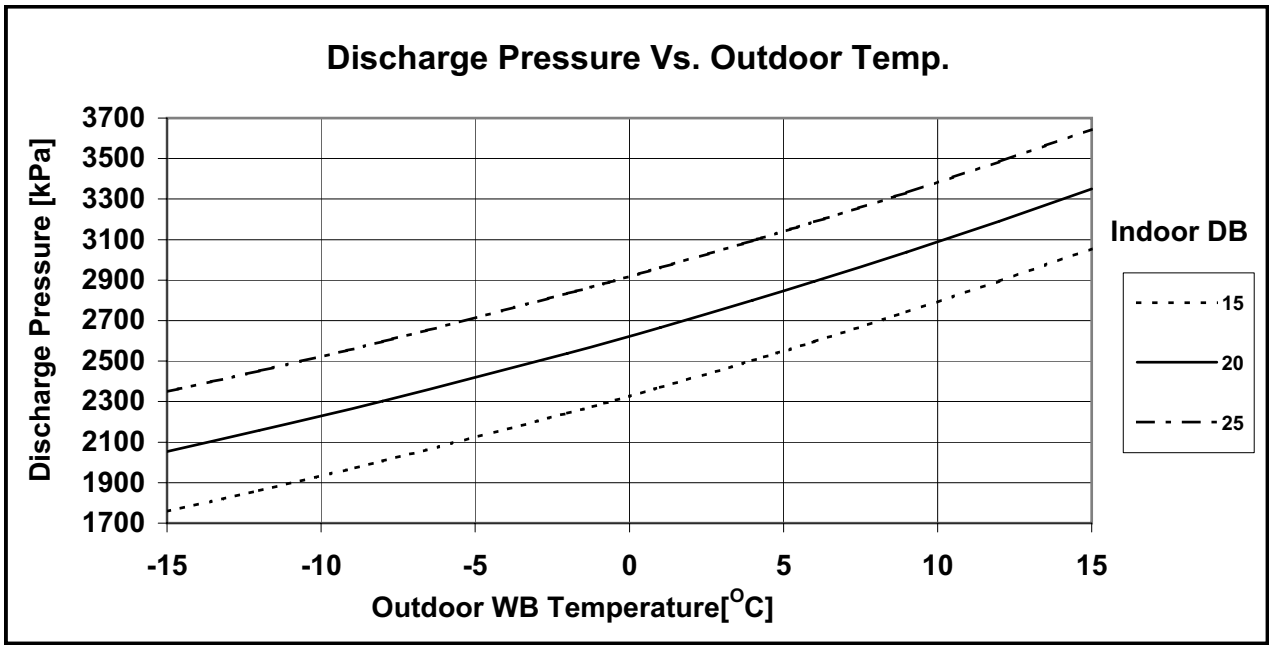
5.6.5 Model: SX 24 DCI Cooling – Test Mode





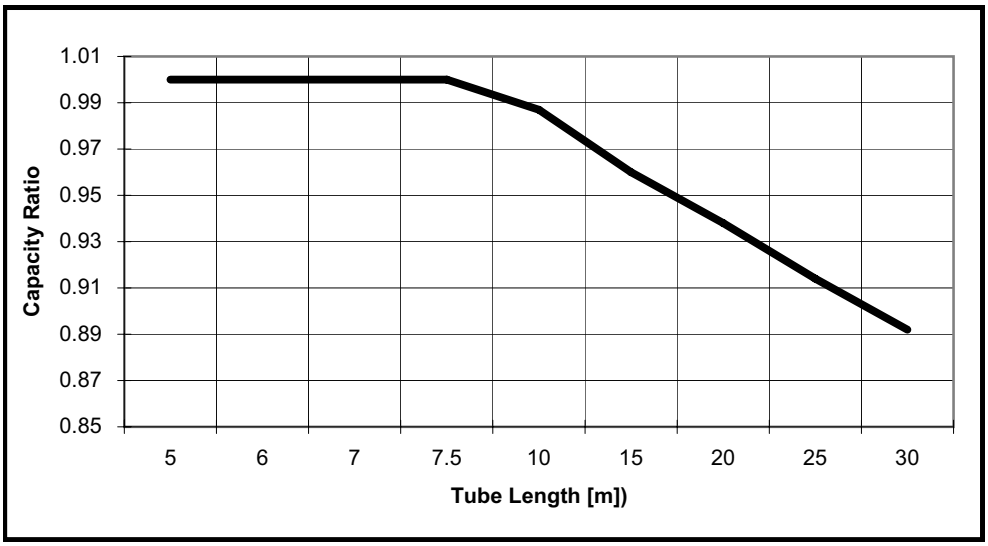
5.6.6 Heating – Test Mode



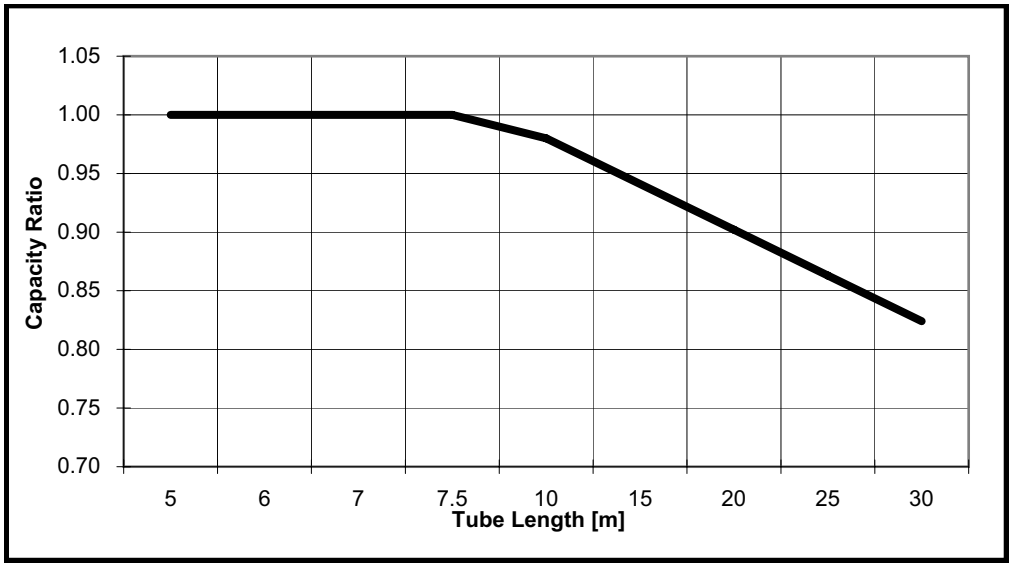


5.7 Capacity Correction Factor Due to Tubing Length

5.7.1 SX 24 DCI :Cooling



5.7.2 Heating



5.8 SX 30 DCI

5.8.1 Cooling Capacity (kW) - Run Mode

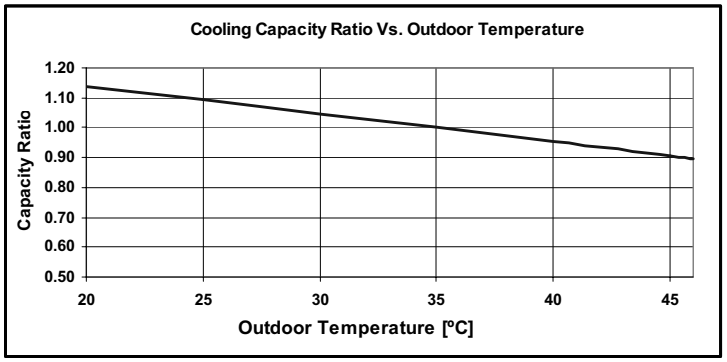
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB/WB TEMPERATURE [°C]				
OU COIL ENTERING AIR DB TEMPERATURE [°C]	**DATA**	**22/15**	**24/17**	**27/19**	**29/21**	**32/23**
-10 - 20 (protection range)	**TC**	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	**TC**	7.39	7.82	8.26	8.69	9.13
	SC	5.72	5.80	5.88	5.97	6.05
	PI	1.88	1.92	1.97	2.01	2.05
30	**TC**	7.01	7.44	7.88	8.31	8.75
	SC	5.49	5.58	5.66	5.75	5.83
	PI	2.14	2.19	2.23	2.27	2.31
35	**TC**	6.63	7.07	**7.50**	7.94	8.37
	SC	5.27	5.35	**5.44**	5.52	5.61
	PI	2.41	2.45	**2.49**	2.53	2.57
40	**TC**	6.25	6.69	7.12	7.56	7.99
	SC	5.05	5.13	5.22	5.30	5.39
	PI	2.67	2.71	2.75	2.79	2.84
46	**TC**	5.80	6.23	6.67	7.10	7.54
	SC	4.78	4.86	4.95	5.03	5.12
	PI	2.98	3.02	3.07	3.11	3.15

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.8.2 Capacity Correction Factors



5.8.3 Heating Capacity (kW) - Run Mode

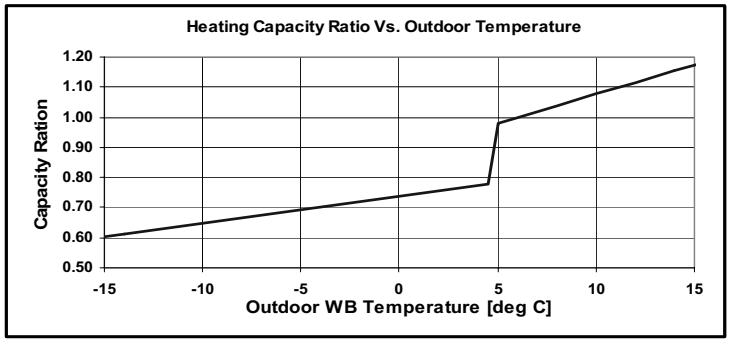
230[V] : Indoor Fan at High Speed.

OU COIL ENTERING AIR DB/WB TEMPERATURE [°C]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [°C]		
		15	20	25
-15/-16	TC	3.96	3.39	2.82
	PI	1.78	1.91	2.04
-10/-12	TC	5.23	4.66	4.09
	PI	2.02	2.14	2.27
-7/-8	TC	6.18	5.61	5.04
	PI	2.19	2.32	2.44
-1/-2	TC	6.65	6.08	5.51
	PI	2.28	2.40	2.53
2/1	TC	6.97	6.40	5.83
	PI	2.34	2.46	2.59
7/6	TC	9.27	**8.70**	8.13
	PI	2.42	**2.55**	2.68
10/9	TC	9.75	9.18	8.61
	PI	2.47	2.60	2.72
15/12	TC	10.23	9.66	9.09
	PI	2.52	2.64	2.77
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

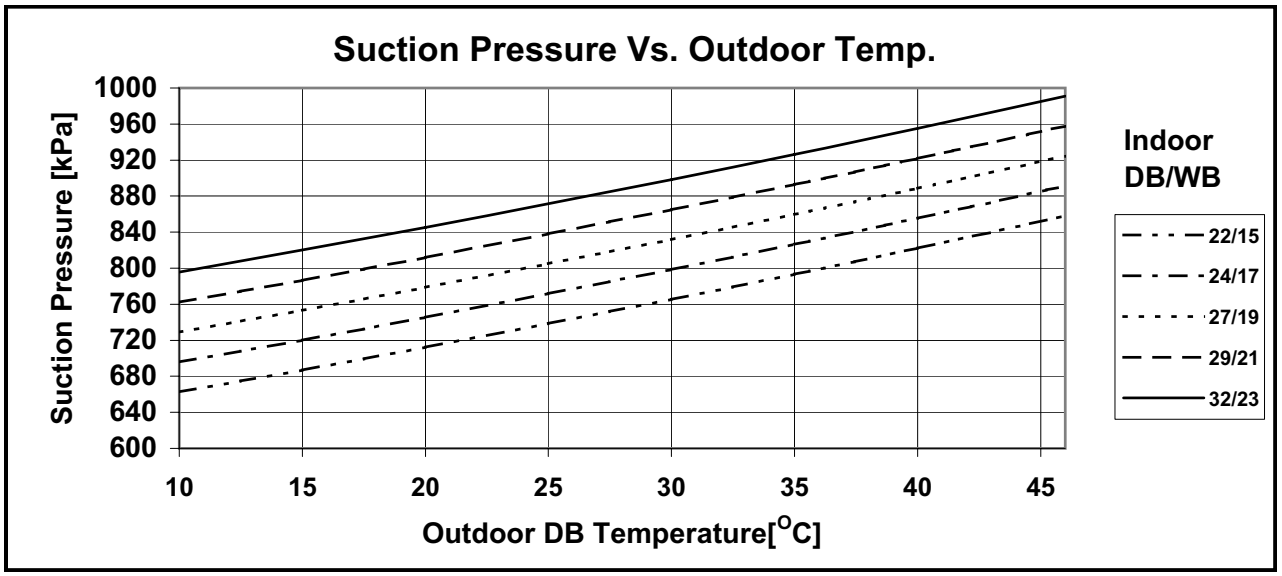
LEGEND

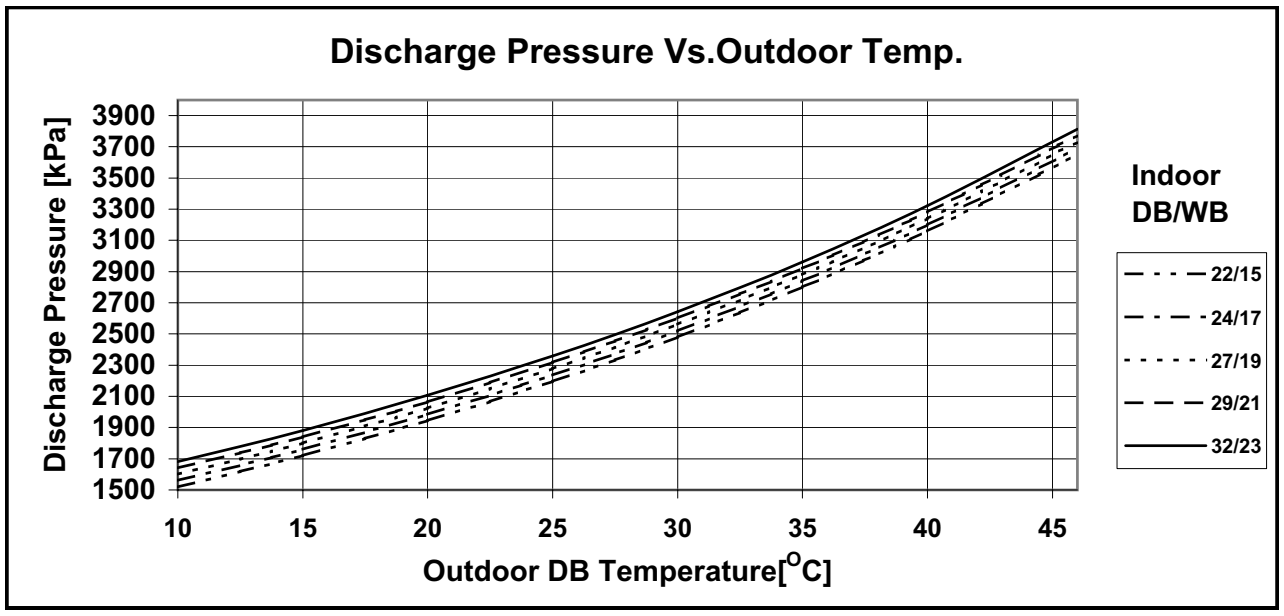
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.8.4 Capacity Correction Factors

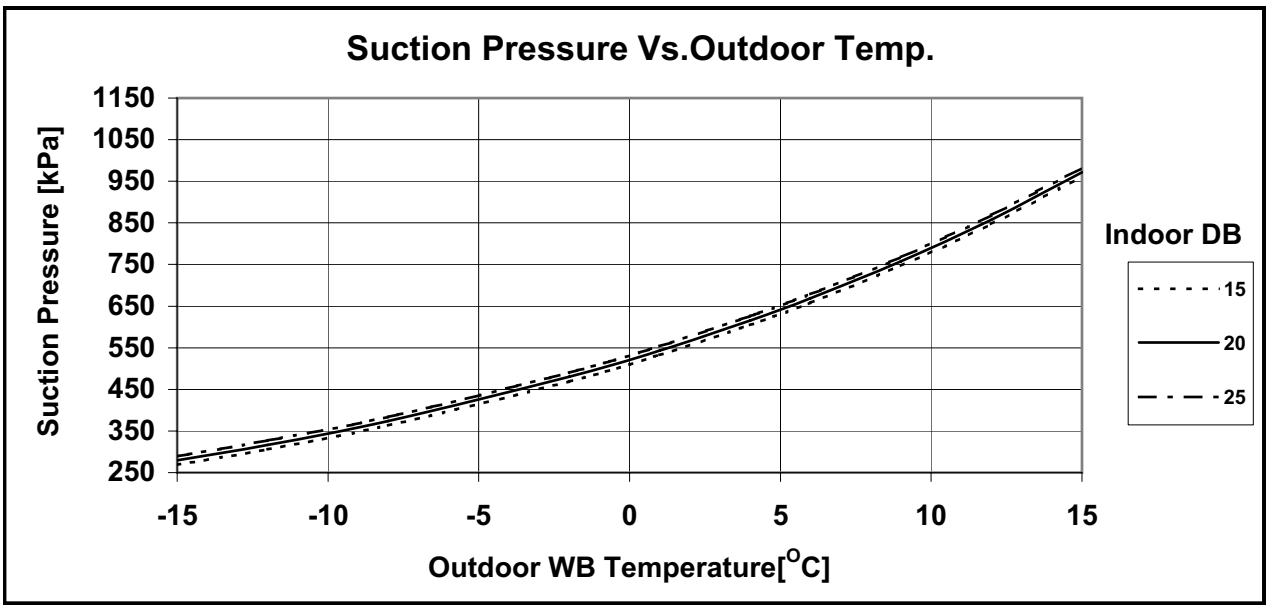


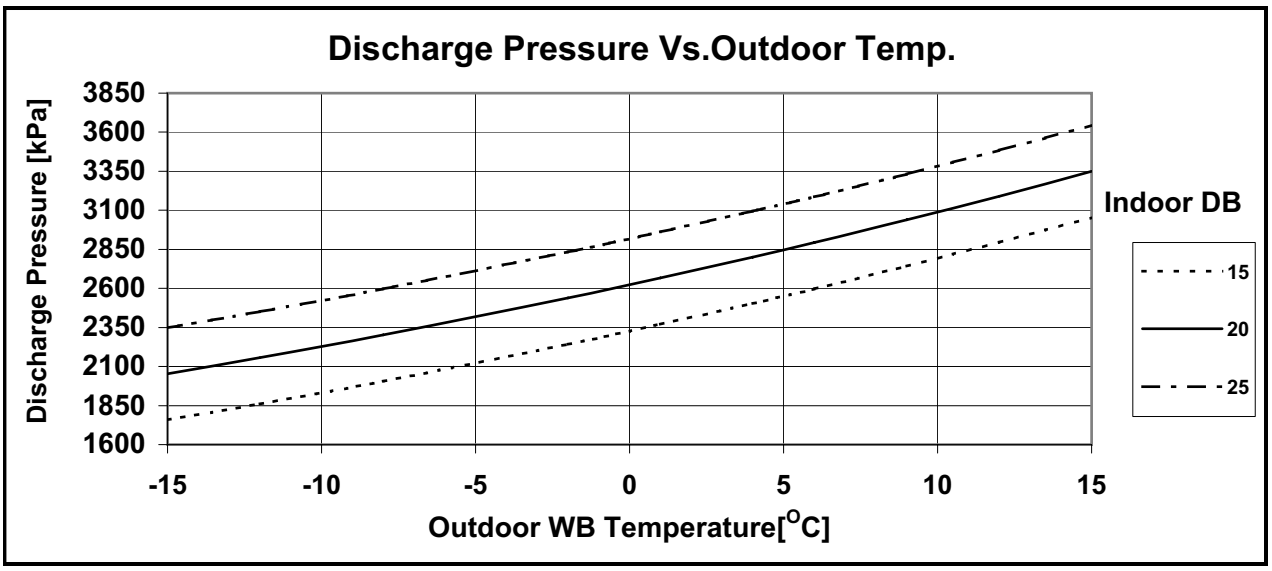
5.8.5 Model: SX 30 DCI Cooling – Test Mode





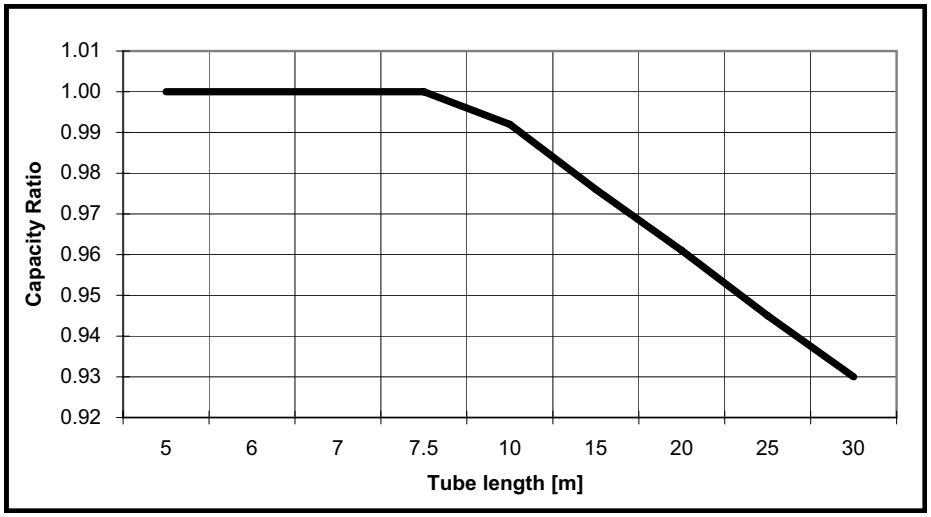
5.8.6 Heating – Test Mode



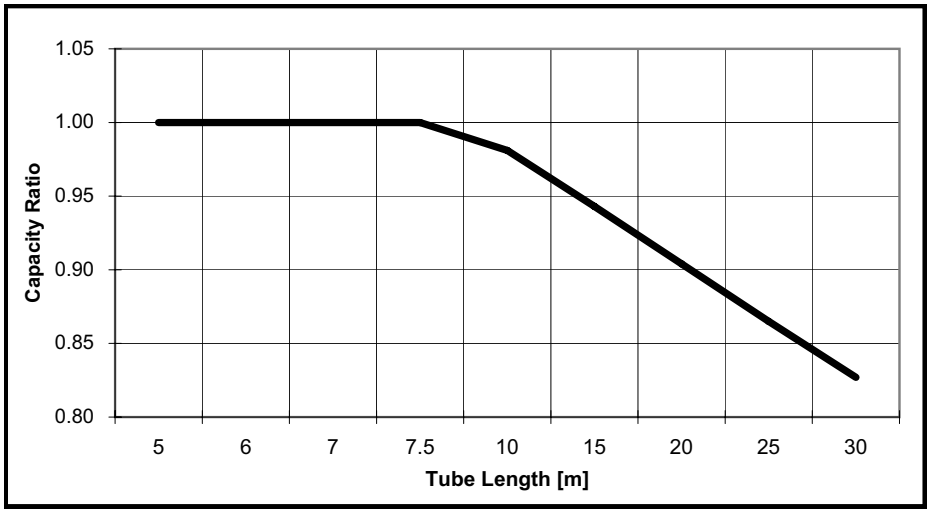


5.9 Capacity Correction Factor Due to Tubing Length

5.9.1 SX 80 DCI :Cooling



5.9.2 Heating



6. SOUND LEVEL CHARACTERISTICS

6.1 Sound Pressure Level

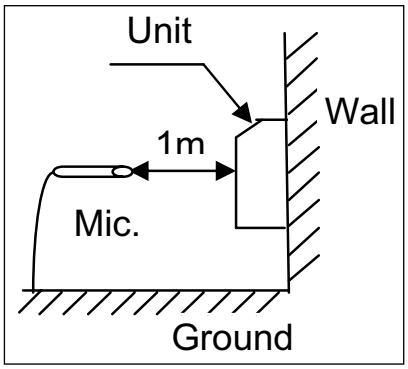
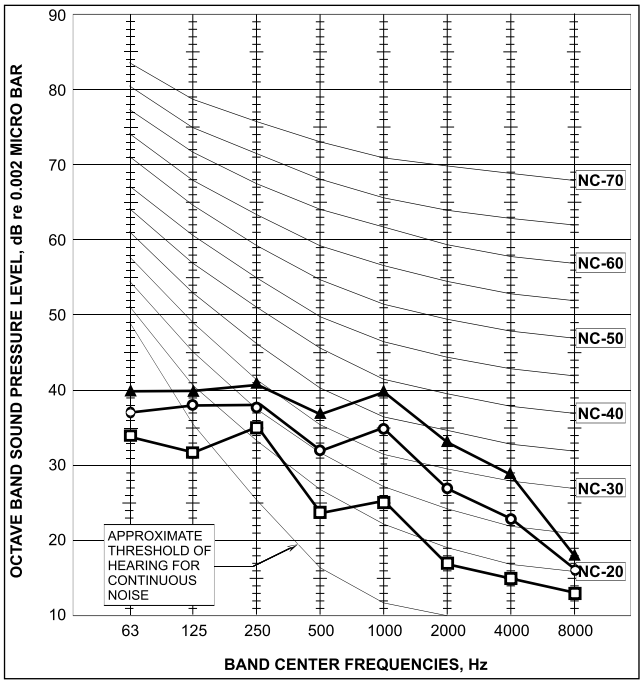


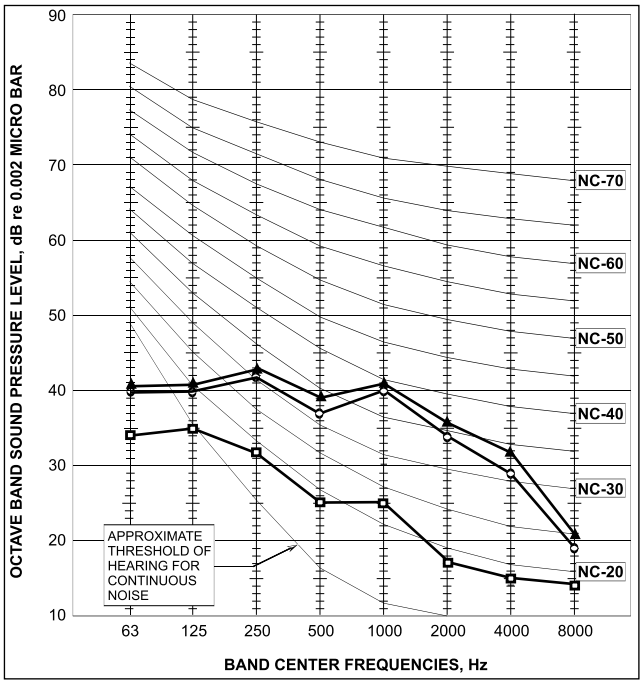
Figure 1

6.2 Soud Pressure Level Spectrum (Measured as Figure 1)

SX 9

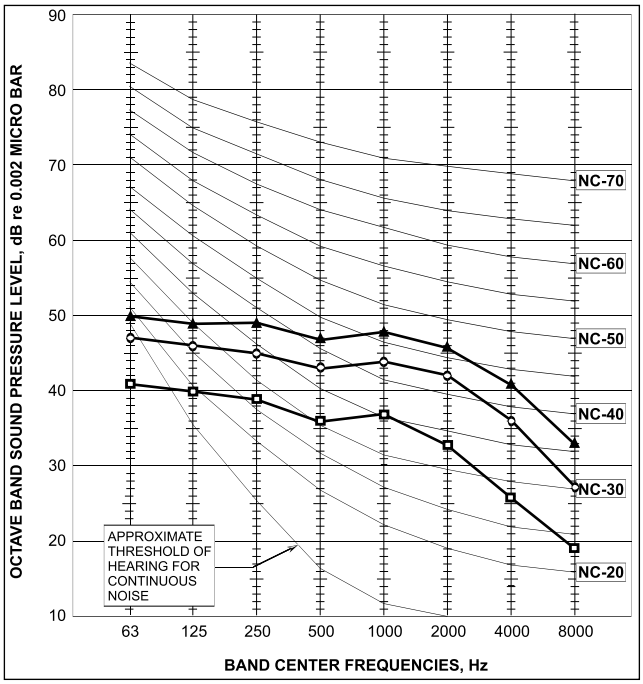


SX 12

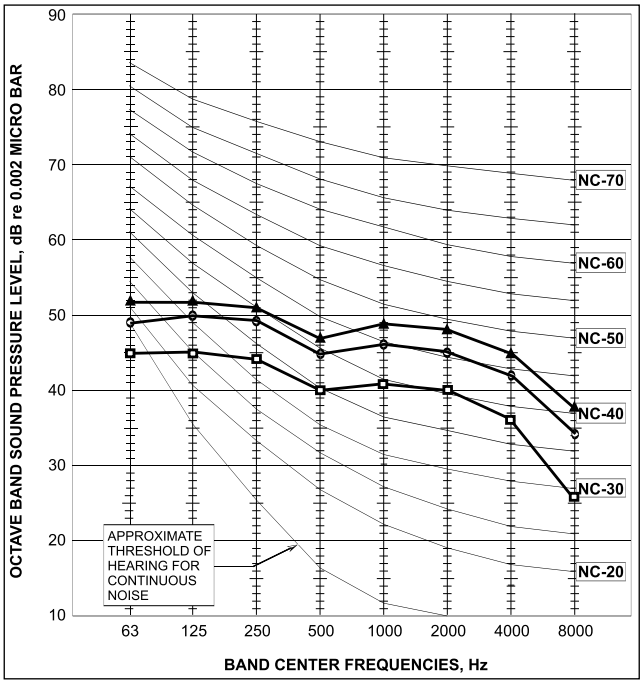


FAN SPEED	LINE
HI	▲
ME	○
LO	□

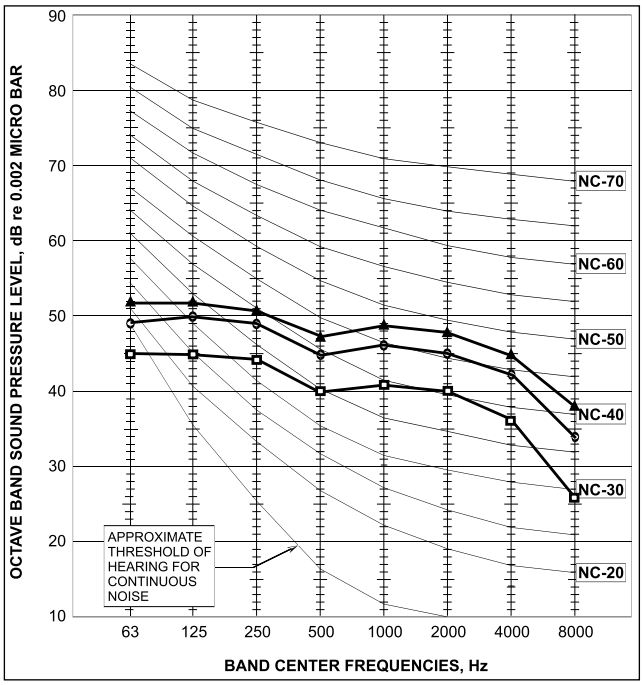
SX 18



SX 24



SX 30



FAN SPEED	LINE
HI	▲
ME	○
LO	□

6.3 Outdoor units

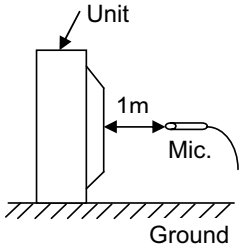
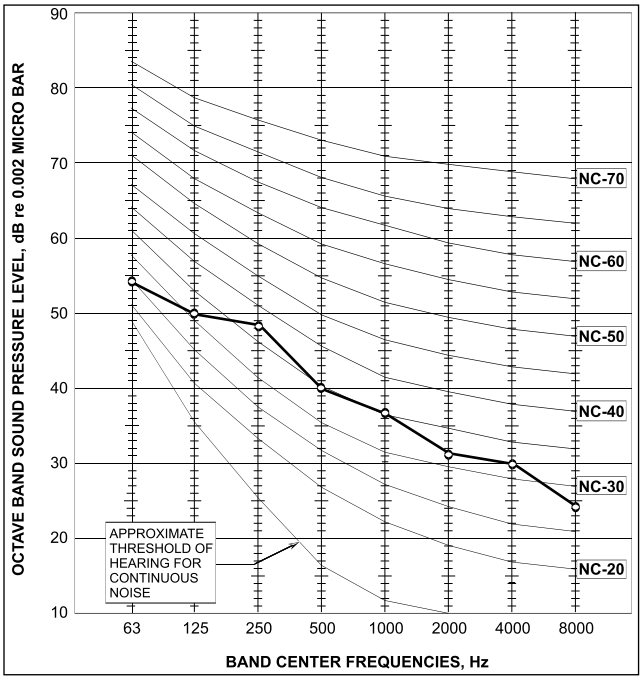


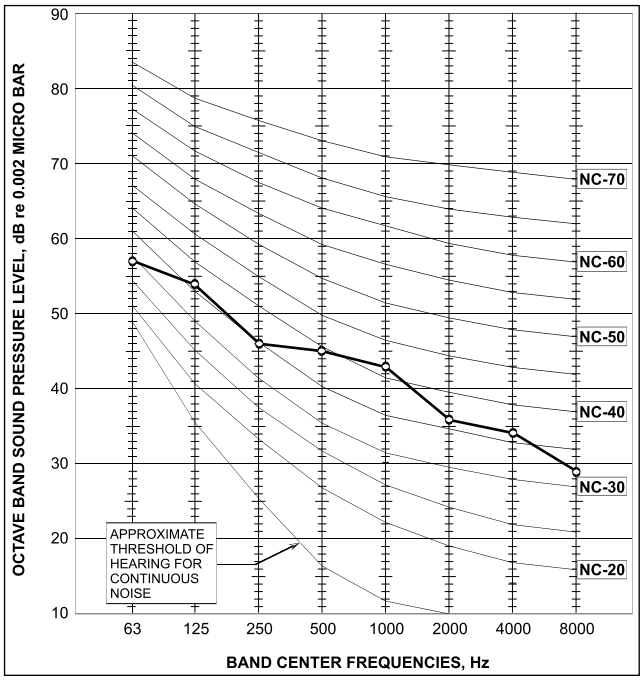
Figure 2

6.4 Sound Pressure Level Spectrum (Measured as Figure 2)

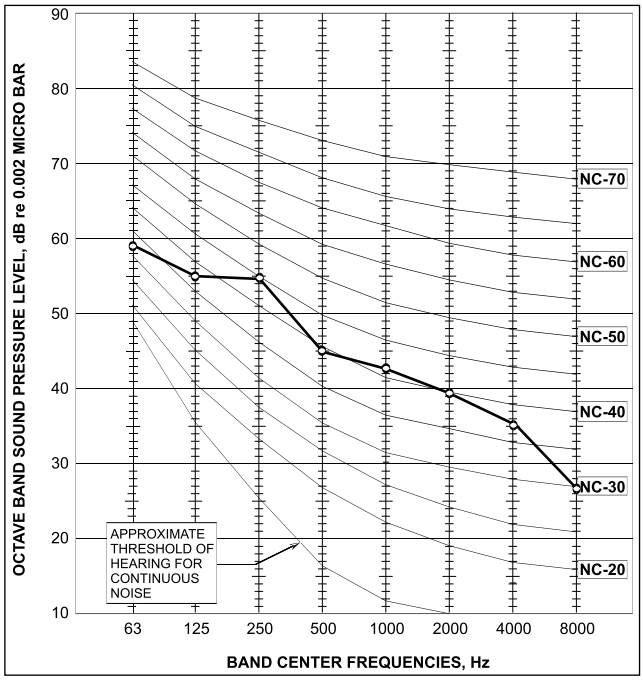
GC 9 DCI Cooling



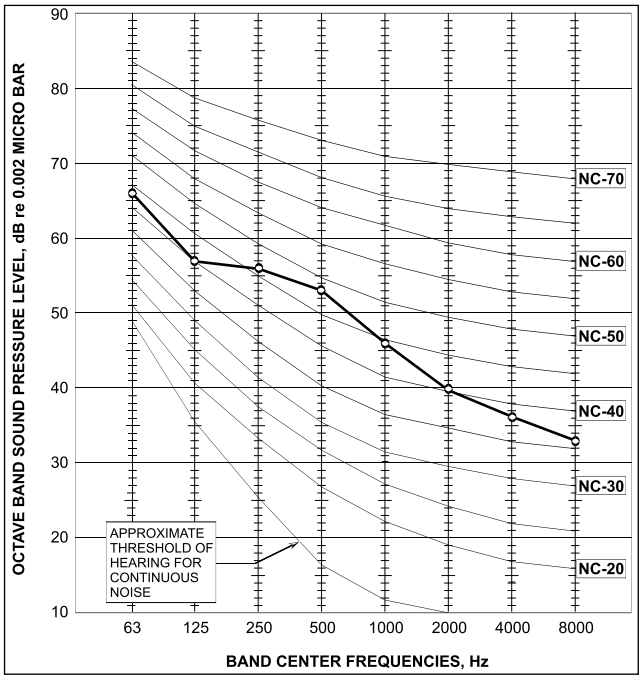
GC 9 DCI Heating



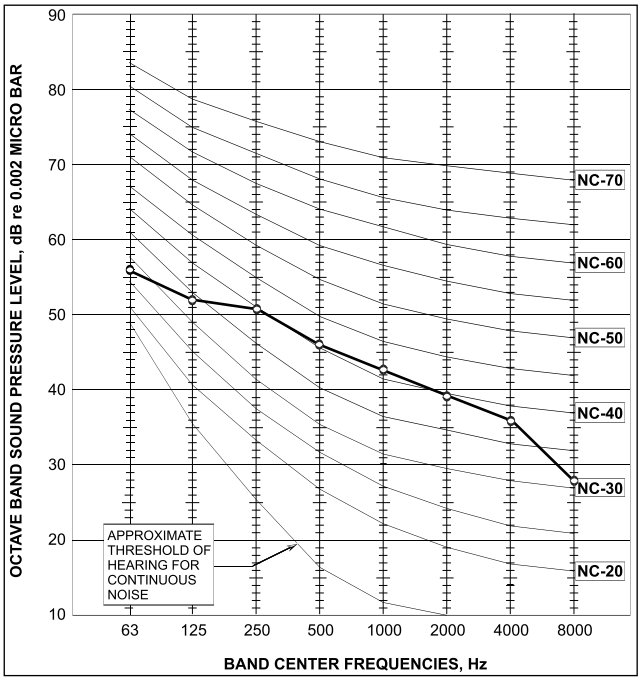
GC 12 DCI Cooling



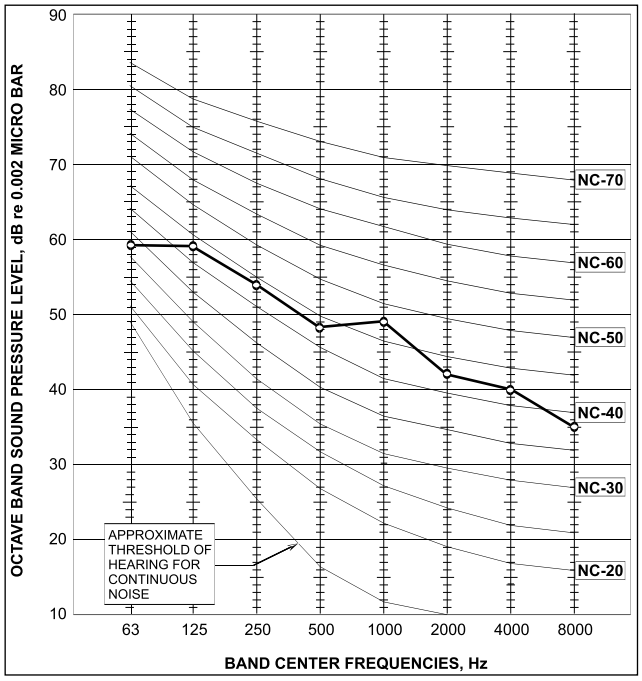
GC 12 DCI Heating



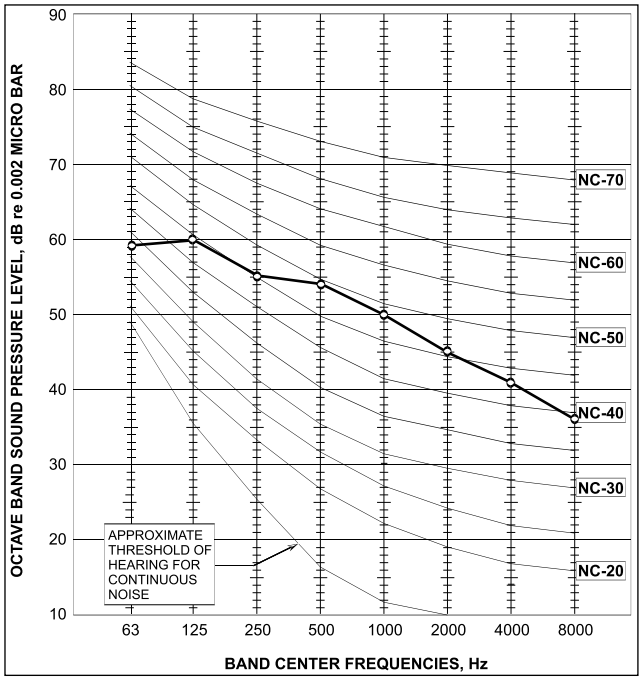
GC 18 DCI Cooling



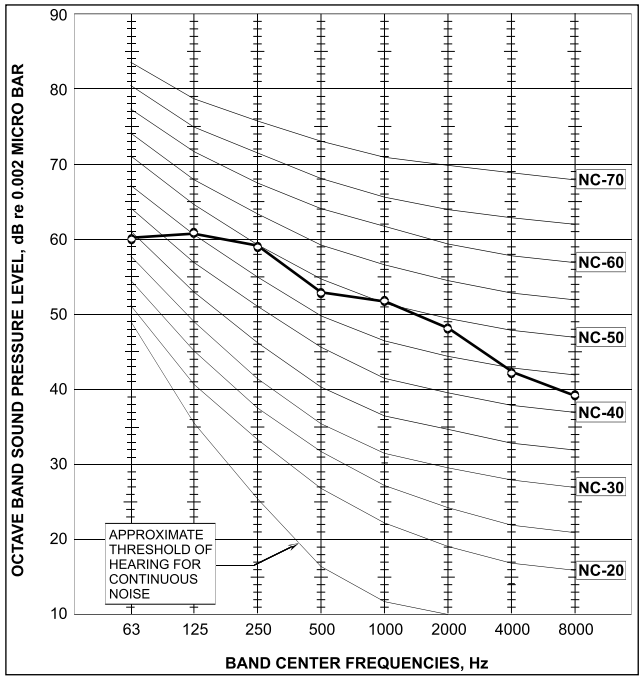
GC 18 DCI Heating



GC 24 DCI Cooling

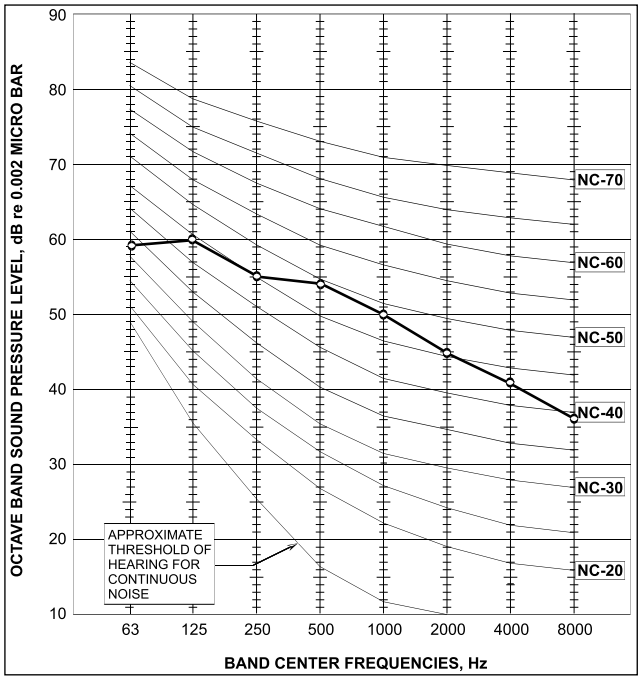


GC 24 DCI Heating

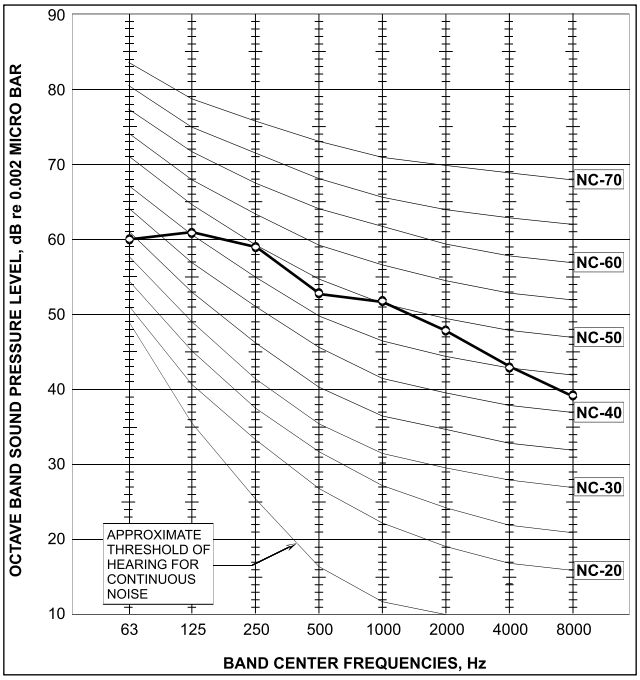


FAN SPEED	LINE
HI	▲
ME	○
LO	□

GC 30 DCI Cooling



GC 30 DCI Heating



FAN SPEED	LINE
HI	▲
ME	○
LO	□

7. ELECTRICAL DATA

7.1 Single Phase Units

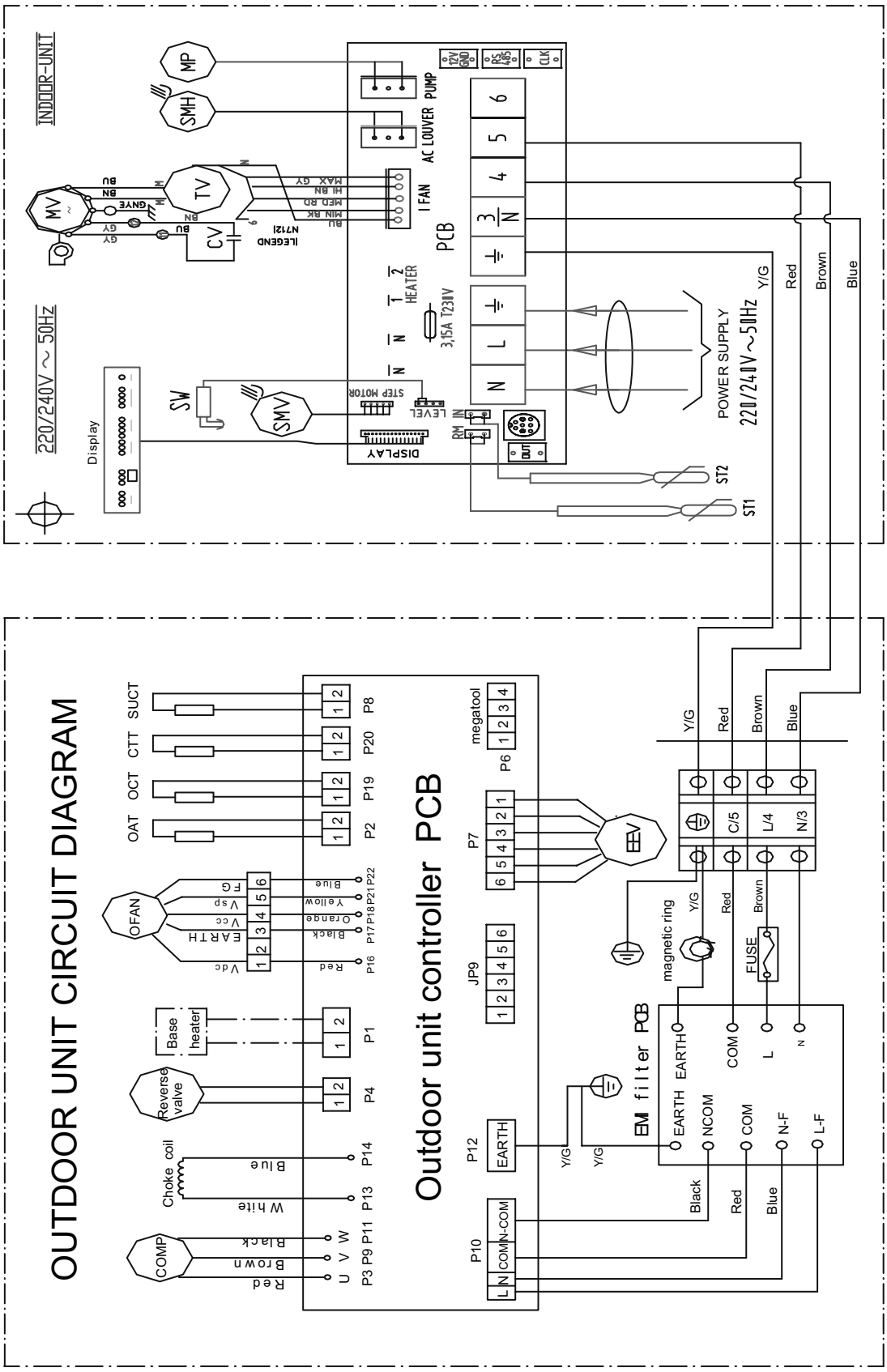
MODEL	SX 9 DCI	SX 12 DCI	SX 18 DCI	SX 24 DCI	SX 30 DCI
Power Supply	To indoor	To indoor	To indoor	To outdoor	To outdoor
	1PH-230V-50Hz	1PH-230V-50Hz	1PH-230V-50Hz	1PH-230V-50Hz	1PH-230V-50Hz
Max Current, A	10	10	12	14	15
Inrush Current A	35	35	35	45	45
Starting Current A	10.5	10.5	10.5	10.5	10.5
Circuit Breaker A	16	16	20	20	20
Power Supply Wiring No.X Cross Section mm^2	3 x 1.5 mm^2	3 x 1.5 mm^2	3 x 2.5 mm^2	3 x 2.5 mm^2	3 x 2.5 mm^2
Interconnecting Cable No.X Cross Section mm^2	4 x 1.5 mm^2	4 x 1.5 mm^2	4 x 2.5 mm^2	4 x 2.5 mm^2	4 x 2.5 mm^2

NOTE

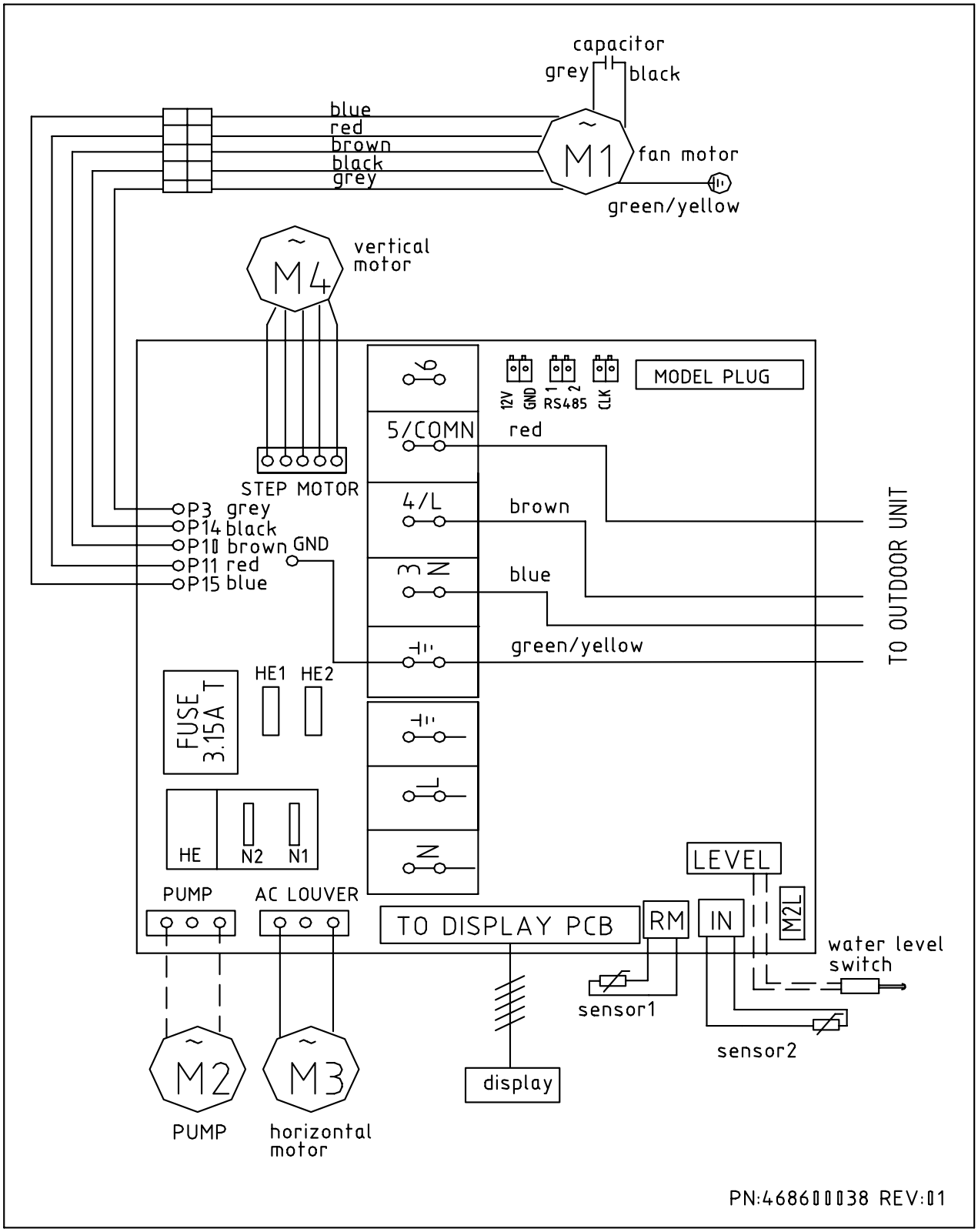
Power wiring cord should comply with local lows and electrical regulations requirements.

8. WIRING DIAGRAMS

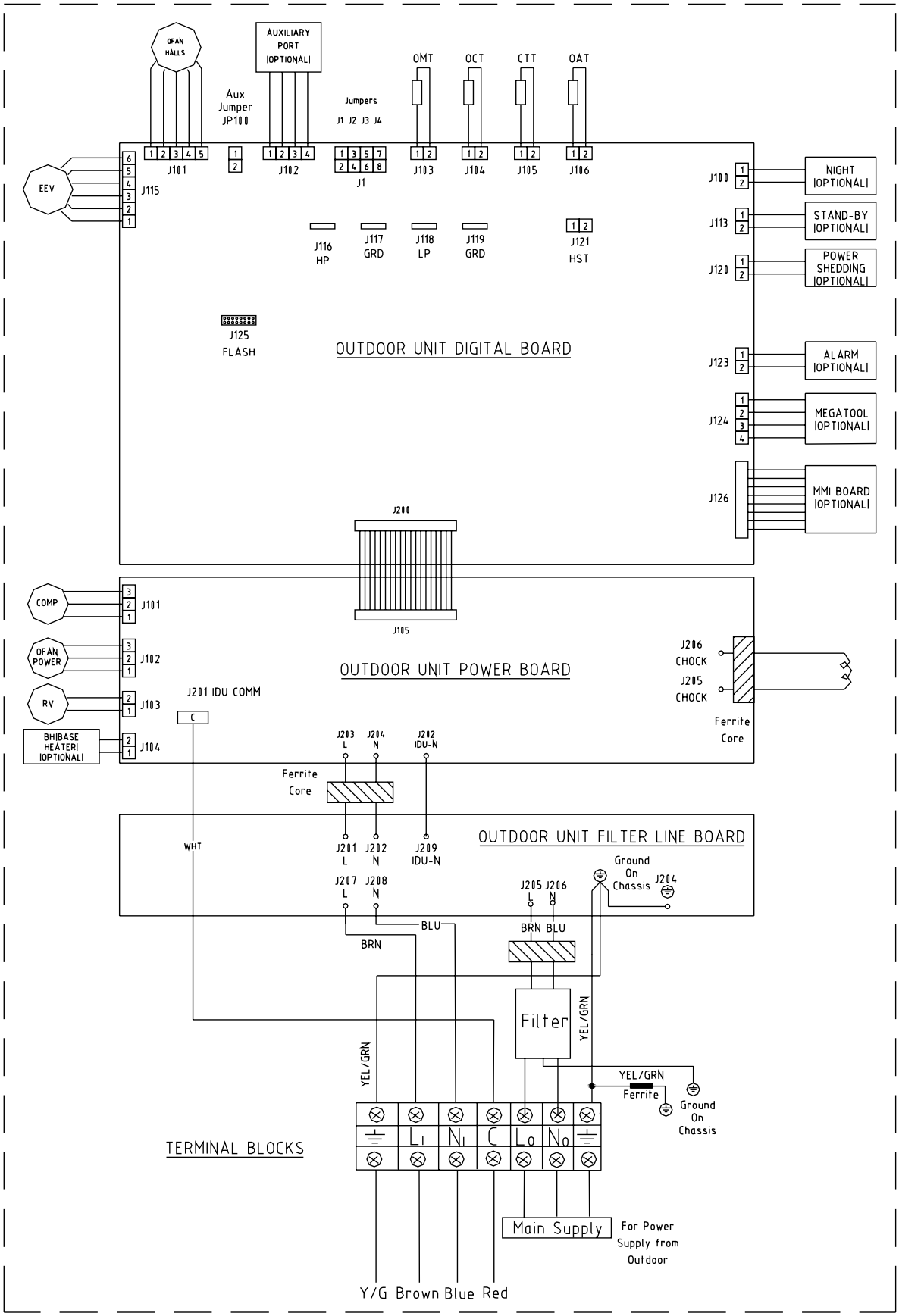
8.1 SX 9, 12, 18 DCI / GC 9, 12, 18 DCI



8.2 Indoor Unit: SX 24, 30 DCI



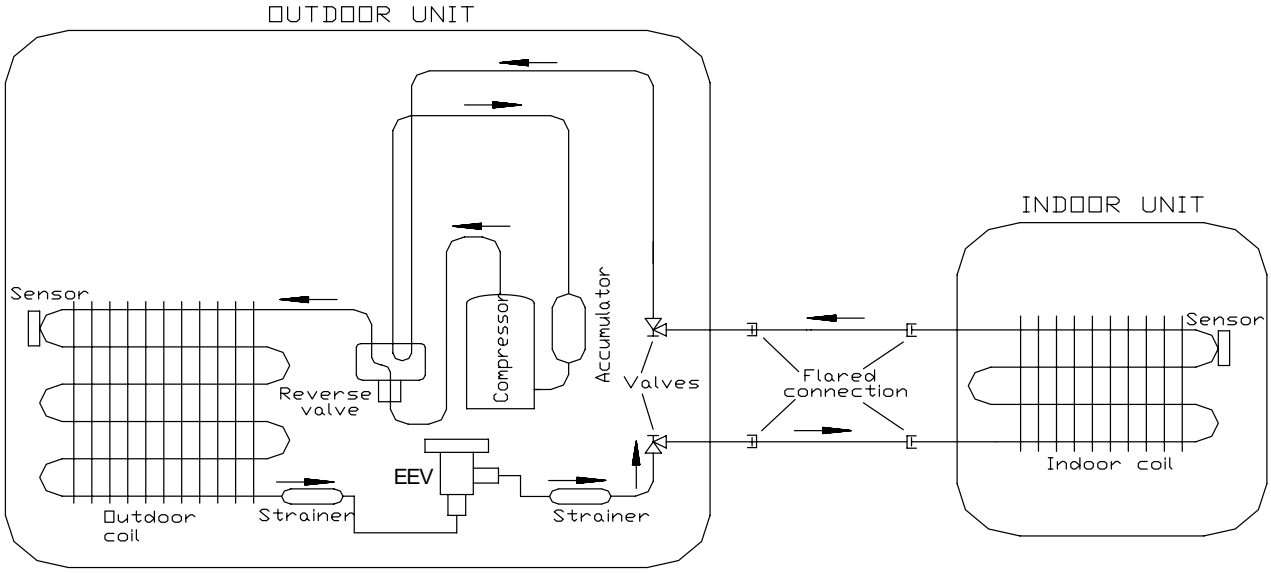
8.3 Outdoor Unit: GC 24, 30 DCI



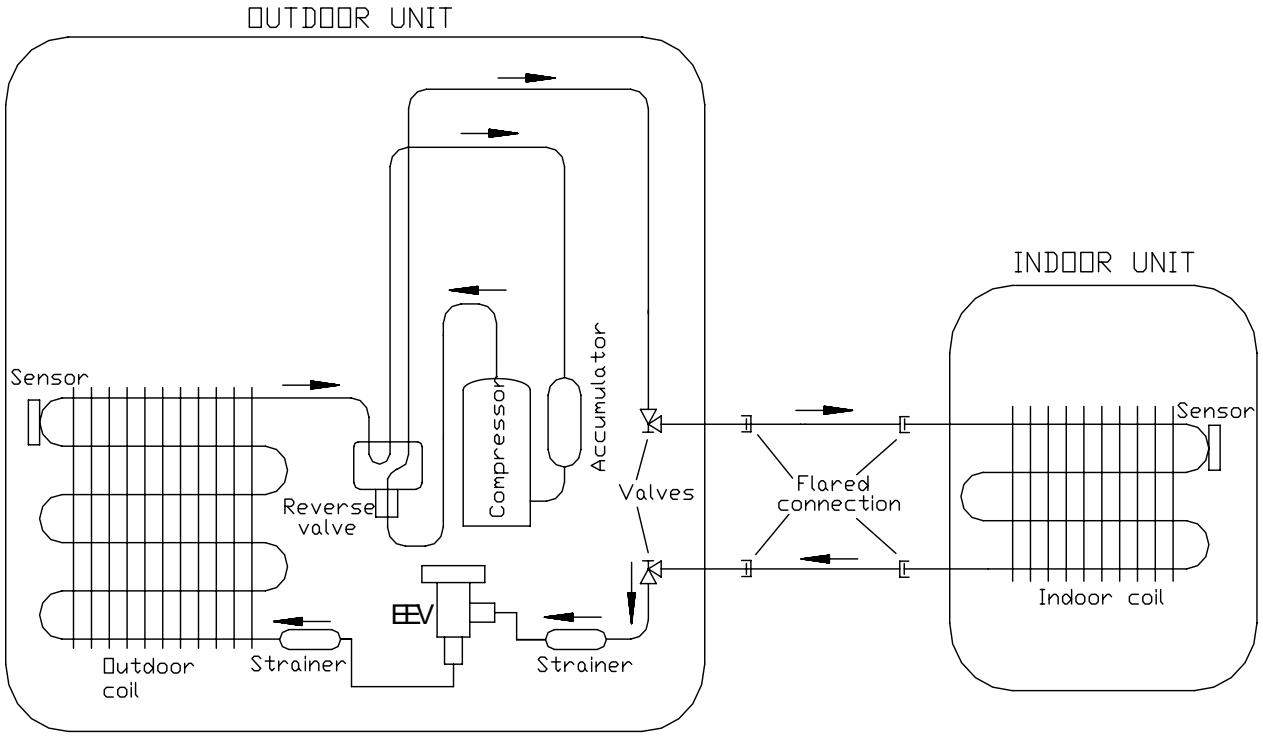
9. REFRIGERATION DIAGRAMS

9.1 SX 9, 12, 18, 24, 30 DCI

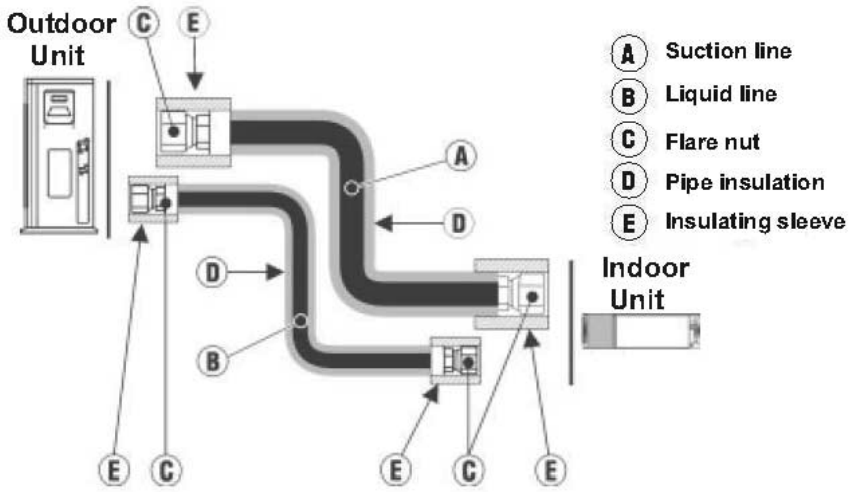
Cooling Mode

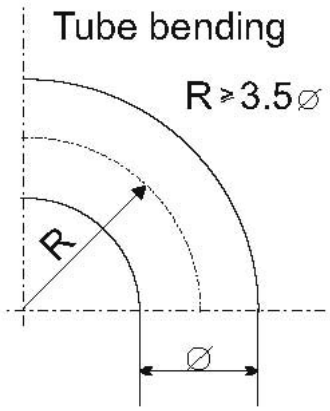


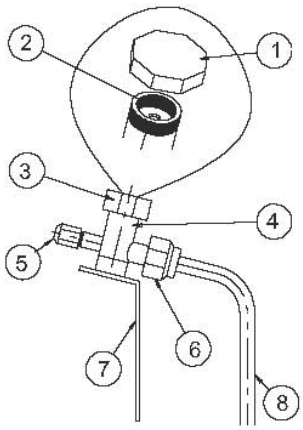
Heating Mode



10. TUBING CONNECTIONS



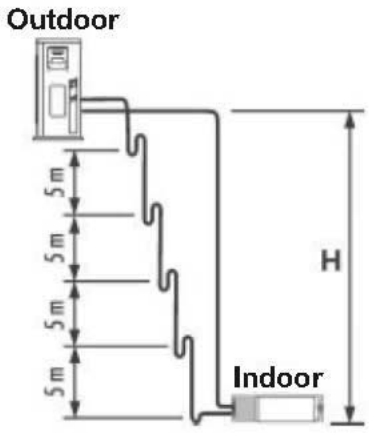




TUBE (Inch) / TORQUE (Nm)	1/4"	3/8"	1/2"	5/8"	3/4"
Flare Nuts	11-13	40-45	60-65	70-75	80-85
Valve Cap	13-20	13-20	18-25	18-25	40-50
Service Port Cap	11-13	11-13	11-13	11-13	11-13

1. Valve Protection Cap-end
2. Refrigerant Valve Port (use Allen wrench to open/close)
3. Valve Protection Cap
4. Refrigerant Valve
5. Service Port Cap
6. Flare Nut
7. Unit Back Side
8. Copper Tube

When the outdoor unit is installed above the indoor unit an oil trap is required every 5m along the suction line at the lowest point of the riser. Incase the indoor unit is installed above the outdoor, no trap is required.



11. TROUBLESHOOTING

WARNING!!!

When Power Up – the whole outdoor unit controller, including the wiring, is under HIGH VOLTAGE!!!

Never open the Outdoor unit before turning off the Power!!!

When turned off, the system is still charged (400V)!!!

It takes about 3 Min. to discharge the system.

Touching the controller before discharging may cause an electrical shock!!!

For safe handling of the controller please refer to section 11.6 below.

11.1 General DCI Single Split System failures and Corrective Actions

No	SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
1	Power supply indicator (Red LED) does not light up.	No power supply	Check power supply. If power supply is OK, check display and display wiring. if OK, replace controller.
2	Unit does not respond to remote control message	Remote control message not reached the indoor unit	Check remote control batteries, if batteries are OK, check display and display wiring, if OK, replace display PCB. If still not OK replace controller.
3	Unit responds to remote control message but Operate indicator (Green LED) does not light up	Problem with display PCB	Replace display PCB. If still not OK replace controller.
4	Indoor fan does not start (louvers are opened and Green LED does light up)	Unit in heat mode and coil is still not warm.	Change to cool mode and check.
		Problem with PCB or capacitor	Change to high speed and Check power supply to motor is higher than 130VAC (for triack controlled motor) or higher than 220VAC for fixed speed motors, if OK replace capacitor, if not OK replace controller
5	Indoor fan works when unit is OFF, and indoor fan speed is not changed by remote control command.	PCB problem	Replace controller
6	Compressor does not start	Electronics control problem or protection	Perform diagnostics (See 11.3), and follow the actions described.
7	Compressor stops during operation and Green LED remains on	Electronic control or power supply problem	Perform diagnostics (See 11.3), and follow the actions described.

No	SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
8	Compressor is on but outdoor fan does not work	Problem with outdoor electronics or outdoor fan	Check outdoor fan motor according to the procedure in section 11.5.3 , if not OK replace controller
9	Unit works in wrong mode (cool instead of heat or heat instead of cool)	Electronics or power connection to RV	Check RV power connections, if OK, Check RV operation with direct 230VAC power supply, if OK, Replace outdoor controller.
10	All components are operating properly but no cooling or no heating	Refrigerant leak	Check refrigeration system.
11	Compressor is over heated and unit does not generate capacity	EEV problem	Check EEV
12	Units goes into protections and compressor is stopped with no clear reason	Control problem or refrigeration system problem	Perform diagnostics (See 11.3), and follow the actions described.
13	Compressor motor is generating noise and no suction occurs	Phase order to compressor is wrong	Check compressor phase order.
14	Water leakage from indoor unit	Indoor unit drainage tube is blocked	Check and open drainage tube.
15	Freezing of outdoor unit in heat mode and outdoor unit base is blocked with ice		Connect base heater.
16	Unit operates with wrong fan speeds or wrong frequency	Wrong jumper settings	Perform diagnostics (See 11.3), and check if units is operating by EEPROM parameters.

11.2 Checking the refrigeration system

Checking system pressures and other thermodynamic measures should be done when system is in Test Mode (in Test mode, system operates in fixed settings). The performance curves given in this manual are given for unit performance in test mode when high indoor fan speed is selected.

Entering test mode:

Set unit to Cool/16 degrees/High indoor fan speed, or Heat/30 degrees/High indoor fan speed, and enter diagnostics.

11.3 Judgment by Indoor/Outdoor Unit Diagnostics

Enter diagnostics mode - press for five seconds Mode button in any operation mode. Acknowledgment is by 3 short beeps and lights of COOL and HEAT LED's. Then, every short pressing of Mode button will scroll between Indoor and Outdoor unit diagnostic modes by the acknowledgment of 3 short beeps and lighting of COOL and HEAT LED's.

During the Outdoor unit diagnostics all four Indoor LED's (STBY, Operate, Filter and Timer) are blinking. When Indoor diagnostics is displayed, all four LED's (STBY, Operate, Filter and Timer) are ON.

When system enters diagnostics mode, only one fault code is shown. Order of priority is from the lower to the higher number. Diagnostics is continuously ON as long as power is ON. The current system operation mode will not be changed.
If no fault occurred in the system, no fault code will be displayed during normal operation mode. The last fault code will be displayed even if the system has recovered from that fault. The last fault will be deleted from the EEPROM after the system has exit diagnostics mode.

In diagnostics mode, system fault / status will be indicated by blinking of Heat & Cool LEDs. The coding method will be as follows:
Heat LED will blink 5 times in 5 seconds, and then will be shut off for the next 5 seconds. Cool LED will blink during the same 5 seconds according to the following Indoor / Outdoor unit tables:
Note: 0 – OFF, 1-ON

11.3.1 Indoor Unit Diagnostics

- **Alarm Output**

The Alarm Output dry contact will be on (closed), when a predefined set faults occur.
The fault set is defined under diagnostics section.
The alarm output will be off (open), when the predefined fault is cleared.
The indoor alarm outputs are defined according to the following table:

No	Problem	AO	5	4	3	2	1
1	ICT is disconnected	Yes	0	0	0	0	1
2	ICT is shorted	Yes	0	0	0	1	0
3	RAT is disconnected	Yes	0	0	0	1	1
4	RAT is shorted	Yes	0	0	1	0	0
5	Reserved (for MSMP used as RGT fault)	No	0	0	1	0	1
*6	ICTE shorted/disconnected (when enabled)	Yes	0	0	1	1	0
*7	Undefined IDU family/model	Yes	0	0	1	1	1
8	No Communication	Yes	0	1	0	0	0
9	No Encoder	No	0	1	0	0	1
10	Reserved	No	0	1	0	1	0
11	Outdoor Unit Fault	No	0	1	0	1	1
…	Reserved	No					
17	Defrost protection	No	1	0	0	0	1
18	Deicing Protection	No	1	0	0	1	0
19	Outdoor Unit Protection	No	1	0	0	1	1
20	Indoor Coil HP Protection	No	1	0	1	0	0
21	Overflow Protection	Yes	1	0	1	0	1
22	Reserved	No					
24	EEPROM Not Updated	No	1	1	0	0	0
25	Bad EEPROM	No	1	1	0	0	1
26	Bad Communication	No	1	1	0	1	0
27	Using EEPROM data	No	1	1	0	1	1

No	Problem	AO	5	4	3	2	1
28	Model A	No	1	1	1	0	0
29	Model B	No	1	1	1	0	1
30	Model C	No	1	1	1	1	0
31	Model D	No	1	1	1	1	1

* CN / LSN Units only

11.3.2 Indoor Unit Diagnostics and Corrective Actions

No.	Fault	Probable Cause	Corrective Action
1	Sensor failures of all types		Check sensor connections or replace sensor
2	Communication mismatch	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
3	No Communication	Communication or grounding wiring is not good.	Check Indoor to Outdoor wiring and grounding
4	No Encoder	Indoor electronics or motor	Check motor wiring, if ok, replace motor, if still not ok, replace Indoor controller.
5	Outdoor Unit Fault	Outdoor controller problem	Switch to Outdoor diagnostics.
6	EEPROM Not Updated	System is using ROM parameters and not EEPROM parameters	No action, unless special parameters are required for unit operation.
7	Bad EEPROM		No action, unless special parameters are required for unit operation.
8	Bad Communication	Communication quality is low reliability	Check Indoor to Outdoor wiring and grounding
9	Using EEPROM data	No problem. System is using EEPRRRROM parameters	

11.3.3 Outdoor Unit Diagnostics

The outdoor alarm outputs are defined in the following way:

No	Problem	AO	5	4	3	2	1
1	OCT is disconnected	Yes	0	0	0	0	1
2	OCT is shorted	Yes	0	0	0	1	0
3	CTT is disconnected	Yes	0	0	0	1	1
4	CTT is shorted	Yes	0	0	1	0	0
5	HST is disconnected (when enabled)	Yes	0	0	1	0	1
6	HST is shorted (when enabled)	Yes	0	0	1	1	0
7	OAT is disconnected (when enabled)	Yes	0	0	1	1	1
8	OAT is shorted (when enabled)	Yes	0	1	0	0	0
9	OMT is disconnected (DCI72 / 72Z / 80)	Yes	0	1	0	0	1

No	Problem	AO	5	4	3	2	1
10	OMT is shorted (DCI72 / 72Z / 80)	Yes	0	1	0	1	0
11	IPM Fault	Yes	0	1	0	1	1
12	Bad EEPROM	No	0	1	1	0	0
13	DC under voltage	Yes	0	1	1	0	1
14	DC over voltage	Yes	0	1	1	1	0
15	AC under voltage	Yes	0	1	1	1	1
16	Mismatch IDU & ODU models (*SW 35V14 and above)	Yes	1	0	0	0	0
17	No Communication	Yes	1	0	0	0	1
18	Reserved	No	1	0	0	1	0
20	Heat sink Over Heating	No	1	0	1	0	0
21	Deicing	No	1	0	1	0	1
22	Compressor Over Heating	No	1	0	1	1	0
23	Compressor Over Current	No	1	0	1	1	1
24	No OFAN Feedback	No	1	1	0	0	0
25	OFAN locked	Yes	1	1	0	0	1
26	Compressor Lock	Yes	1	1	0	1	0
27	Bad Communication	No	1	1	0	1	1
28	Missing ODU configuration (*SW 35V14 and above)	Yes	1	1	1	0	0
29	Undefined ODU Model (*SW 35V14 and above)	Yes	1	1	1	0	1
30	For future use	No	1	1	1	1	0
31	Operation condition is exceeded (*SW 35V14 and above)	Yes	1	1	1	1	1

*Alarm Output - is on SW 35V14 and above. There is no alarm on SW 35V12 and below/

11.3.4 Outdoor Unit Diagnostics and Corrective Actions

No.	Fault	Probable Cause	Corrective Action
1	Sensors failures of all types		Check sensors connections or replace sensors.
2	IPM Fault	Electronics HW problem	Check all wiring and jumper settings, if OK, replace electronics.
3	Bad EEPROM		No action, unless special parameters are required for unit operation.
4	DC under/over Voltage	Electronics HW problem	Check outdoor unit power supply voltage
5	AC under Voltage		Check outdoor unit power supply voltage
6	Indoor / Outdoor unit Communication mis-match	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
7	No Communication	Communication or grounding wiring is not good.	Check Indoor to Outdoor wiring and grounding

No.	Fault	Probable Cause	Corrective Action
8	Compressor Lock		Switch unit to STBY and restart If still not ok check compressor (11.5.4) If comp is ok replace OU controller If compressor is not ok replace compressor
9	Bad Communication	Communication quality is low reliability	Check Indoor to Outdoor wiring and grounding

11.4 Judgment by MegaTool

MegaTool is a special tool to monitor the system states.
Using MegaTool requires:

- A computer with RS232C port.
- A connection wire for MegaTool.
- A special MegaTool software.

Use MegaTool according to following procedure:

- Setup MegaTool software: copy the software to the computer.
- Connect RS232C port in computer with MegaTool port in Indoor/Outdoor unit controller by the connection wire.
- Run the software and choose the COM port, you can monitor the A/C system state in monitor tab.

11.5 Simple procedures for checking the Main Parts

11.5.1 Checking Mains Voltage.

Confirm that the Mains voltage is between 198 and 264 VAC. If Mains voltage is out of this range, abnormal operation of the system is expected. If in range check the Power (Circuit) Breaker and look for broken or loosed cable lugs or wiring mistake(s).

11.5.2 Checking Power Input.

If Indoor unit power LED is unlighted, power down the system and check the fuse of the Indoor unit. If the fuse is OK replace the Indoor unit controller. If the fuse has blown, replace the fuse and power up again.
Checking Power Input procedure for the Outdoor unit is the same as with the Indoor unit.

11.5.3 Checking the Outdoor Fan Motor.

Enter Test Mode (where the OFAN speed is high)
Check the voltage between lead wires according to the normal value as following:

- Between red wire and black wire: 310VDC +/- 20V
- Between orange wire and black wire: 15VDC +/- 1V
- Between yellow wire and black wire: 2-6VDC

11.5.4 Checking the Compressor.

The compressor is brushless permanence magnetic DC motor. Three coil resistance is same. Check the resistance between three poles. The normal value should be below 0.5 ohm (TBD).

11.5.5 Checking the Reverse Valve (RV).

Running in heating mode, check the voltage between two pins of reverse valve connector, normal voltage is 220VAC.

11.5.6 Checking the electrical expansion valve (EEV).

The EEV has two parts, drive part and valve. The drive part is a step motor; it is ringed on the valve. Check the drive voltage (12VDC). When Outdoor unit is power on, EEV shall run and have click and vibration.

11.6 Precaution, Advise and Notice Items

11.6.1 High voltage in Outdoor unit controller.

Whole controller, including the wires that are connected to the Outdoor unit controller may have the potential hazard voltage when power is on. Touching the Outdoor unit controller may cause an electrical shock.

Advise: Don't touch the naked lead wire and don't insert finger, conductor or anything else into the controller when power is on.

11.6.2 Charged Capacitors

Three large-capacity electrolytic capacitors are used in the Outdoor unit controller. Therefore, charging voltage (380VDC) remains after power down. Discharging takes about four minutes after power is off. Touching the Outdoor unit controller before discharging may cause an electrical shock.

11.6.3 Additional advises

- When disassemble the controller or the front panel, turn off the power supply.
- When connecting or disconnecting the connectors on the PCB, hold the whole housing, don't pull the wire.
- There are sharp fringes and sting on shell. Use gloves when disassemble the A/C units.

12. CONTROL SYSTEM

12.1 General Functions and Operating Rules

The DCI software is fully parametric.
All the model dependent parameters are shown in Blue color and with Italic style [*parameter*].
The parameters values are given in the last section of this control logic chapter of the service manual.

12.1.1 System Operation Concept

The control function is divided between indoor and outdoor unit controllers. Indoor unit is the system 'Master', requesting the outdoor unit for cooling/heating capacity supply. The outdoor unit is the system 'Slave' and it must supply the required capacity unless it enters into a protection mode avoiding it from supplying the requested capacity.
The capacity request is transferred via indoor to outdoor communication, and is represented by aparameter called 'NLOAD'. NLOAD is an integer number with values between 0 and 127, and it represents the heat or cool load felt by the indoor unit.

12.1.2 Compressor Frequency Control

12.1.2.1 NLOAD setting

The NLOAD setting is done by the indoor unit controller, based on a PI control scheme.
The actual NLOAD to be sent to the outdoor unit controller is based on the preliminary LOADcalculation, the indoor fan speed, and the power shedding function.
NLOAD limits as a function of indoor fan speed:

Indoor Fan Speed Maximum NLOAD Cooling Maximum NLOAD Heating

Indoor Fan Speed	Maxium NLOAD Cooling	Maxium NLOAD Heating
Low	*MaxNLOADIF1C*	*MaxNLOADIF1H*
Medium	*MaxNLOADIF2C*	*MaxNLOADIF2H*
High	*MaxNLOADIF3C*	*MaxNLOADIF3H*
Turbo	*MaxNLOADIF4C*	*MaxNLOADIF4H*
Auto	*MaxNLOADIF5C*	*MaxNLOADIF5H*

NLOAD limits as a function of power shedding:

Mode	Power Shedding OFF	Power Shedding ON
Cooling	No limit	Nominal Cooling
Heating	No limit	Nominal heating

12.1.3 Target Frequency Setting

12.1.3.1 Target Frequency Setting for DCI 50/60/72Z

The compressor target frequency is a function of the NLOAD number sent from the indoor controller and the outdoor air temperature.

Basic Target Frequency Setting:

NLOAD	Target Frequency
127	*Maximum Frequency*
10<NLOAD<127	Interpolated value between minimum and maximum frequency
10	Minimum frequency
0	Compressor is stopped

Target frequency limits as a function of outdoor air temperature (OAT):

OAT Range	Cooling Mode limits	Heating Mode limits
OAT < 6	***MaxFreqAsOATC***	**No limit**
6 ≤ OAT < 15		***MaxFreqAsOAT1H***
15 ≤ OAT < 28		***MaxFreqAsOAT2H***
28≤ OAT	**No limit**	

12.1.3.2 Target Frequency Setting for DCI 72/80

The compressor Target Speed is calculated according to the following formula:

$$T\arg et\ Speed_{load} = \max\left[MinSpeed, MaxSpeed \cdot \frac{ODUNload}{127} \right]$$

MiniSpeed, MaxSpeed are defined as following:

When the unit is in the cool mode, $MiniSpeedC = 15Hz,\ MaxSpeed = 75Hz$

When the unit is in the heat mode, $MiniSpeedH = 20Hz,\ MaxSpeed = 95Hz$

ODU NLOAD is caculated according to the IDU NLoad:

$$ODU\ NLOAD = \min\left\{ \frac{3 * IDUNLOAD}{ODUCode}, 127 \right\}$$

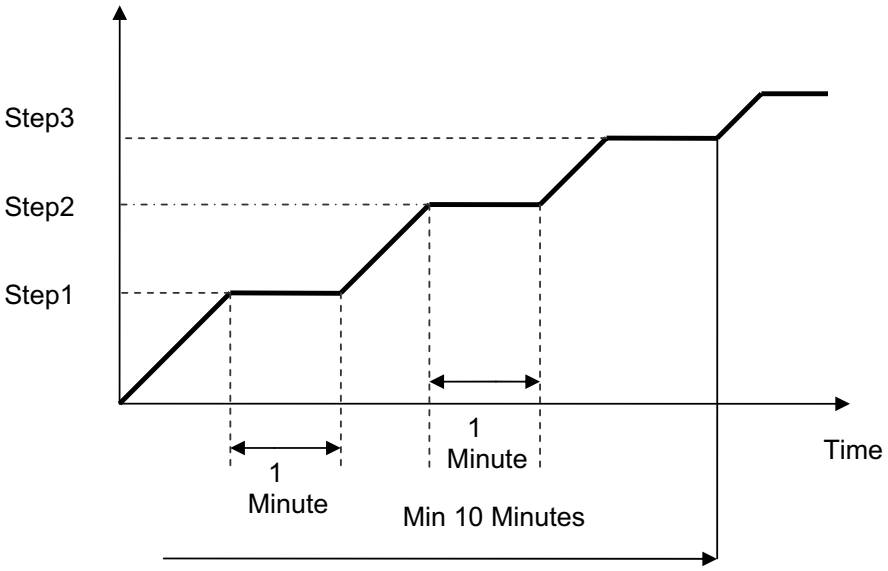
OAT	ODUCodeC	ODUCodeC	IDUNLOAD
≤-5	3	3	Refer to sect.112.1.2.1
≤-5	3.8	3	

12.1.4 Frequency Changes Control

When the unit is running normally , the compressor frequency change rate is 1 Hz/sec.

12.1.5 Compressor Starting Control

12.1.5.1 Compressor starting control for DCI50/60/72Zzz



12.1.5.2 Compressor starting control for DCI72/80

Step 1

Whenever the compressor starts up, after it has been off for more than 45 minutes, the compressor frequency cannot go below *Step1RPS* for 3 continuous minutes (*this rule comes to ensure oil return to the compressor*).

Step 2

The compressor speed cannot go above *Step2RPS* once after each compressor start up for 3 continuous minutes (*this rule comes to prevent oil exit from the compressor after its start up)*.

Step 3

The speed cannot go higher than *Step3RPS* unless it was operating for more than 1 continuous minutes between *Step3RPS* – 5 and *Step3RPS* .

After passing above *Step3RPS*, this rule is re-applied when passing below *Step3RPS*-5.

12.1.6 Minimum On and Off Time

3 minutes

12.1.7 Indoor Fan Control

8 Indoor fan speeds are determined for each model. 4 speeds for cool/dry/fan modes and 4 speeds for heat mode.

When user sets the indoor fan speed to a fixed speed (Low/ Medium/ High), unit will operate constantly at set speed.

When Auto Fan is selected, indoor unit controller can operate in all speeds. The actual speed is set according to the cool/heat load.

12.1.7.1 Turbo Speed

The Turbo speed is activated during the first 30 minutes of unit operation when auto fan speed is selected and under the following conditions:

Difference between set point and actual room temperature is bigger then 3 degrees.

Room temperature > 22 for cooling, or < 25 for heating.

12.1.8 Outdoor Fan Control

12.1.8.1 Outdoor Fan Control for DCI50/60

7 outdoor fan speeds are determined for each model. 3 speeds for cool and dry modes, and 3 speeds for heat mode, and a very low speed.

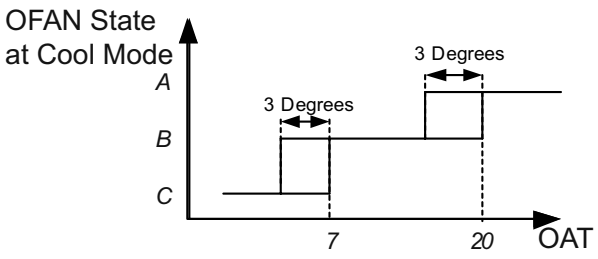
Outdoor fan speed is a function of compressor frequency and outdoor air temperature (OAT).

4 routines for fan control are determined. The control routine selection depends on operation mode, compressor speed, outdoor air temperature (OAT) and heat sink temperature (HST).

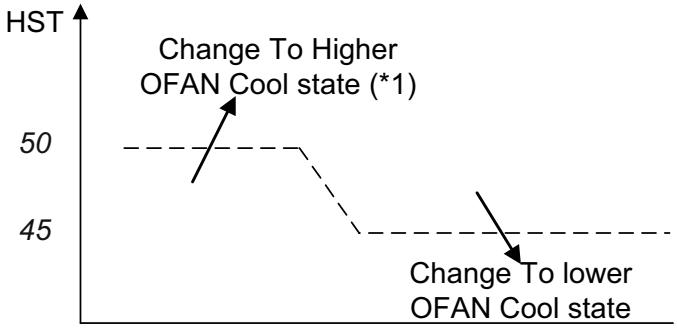
Routine	Conditions
A	Heating with OAT < 15°C or Cooling with OAT > 20°C, or Faulty OAT
B	Cooling with 20°C > OAT > 7°C
C	Cooling with 7°C > OAT
D	Heating with OAT > 15°C

Compressor Target Frequency	OFAN Speed			
	Routin A	Routin B	Routin C	Routin D
Freq=0	OFF	OFF	OFF	OFF
10 ≤ Freq < *OFLowFreq*	Low	Low	VL	Low
OFLowFreq ≤ Freq< *OFMedFreq*	Medium	Low	VL	Low
OFMedFreq≤ Freq	High	Low	Low	Medium

When compressor is switched to OFF and the heat sink temperature is above 55 degrees, the outdoor fan will remain ON in low speed for up to 3 minutes.



Note: Periorities A>B>C



*(*1) If State C, change to B*
If State B, change to A

12.1.8.2 Outdoor Fan Control for GC 24, 30 DCI

OFAN operates between any speed *OFMinRPM* to *OFMaxRPM*.

The fan speed is also related to protections and OMT value.

* For DCI 72Z, in heating mode the OFAN speed is related to OCT.

12.1.9 EEV (Electronic Expansion Vavle) Control

12.1.9.1 EEV Control for GC 9, 12, 18 DCI

EEV opening is defined as EEV = EEVOL + EEVCV

EEVOL is the initial EEV opening as a function of the compressor frequency, operation mode, unit model and capacity.

EEVCV is a correction value for the EEV opening that is based on the compressor temperature.

During the first 5 minutes of compressor operation EEVCV = 0.

Once the first 5 minutes are over, the correction value is calculated as follow: EEVCV(n) = EEVCV(n-1) + EEVCTT

EEVCTT is the correction based on the compressor temperature. A target compressor temperature is set depending on frequency and outdoor air temperature, and the actual compressor temperature is compared to the target temperature to set the required correction to the EEV opening.

12.1.9.2 EEV Control for DCI72/72Z/80

The target EEV value is the sum of open loop value (OL) and a result of the accumulative correction values (CV).

$$EEV = EEV_{OL} + \sum EEV_{CV}$$

The EEV intial value(OL) is defined as follow:

EEV_{OL}= *EEVBaseOpenLoop* + *EEVOpenLoopCpctyCrct* + *EEVTubeCompnst*

Basic EEV open loop		Open Loop correction	EEV tube Length compensation
Mode	72/80	72/80	72/80
COOL	220	25	0
HEAT	170	30	0

*For DCI72Z

The initial EEV_{OL} is defined in accordance to the compressor frequency

EEV_{CV} is a correction value for the EEV opening that is based on the compressor temperature, During the first 6 minutes after SB the correction is not calculated. After that the correction value is updated every *30* seconds.

12.1.10 RV(Reversing Valve) Control

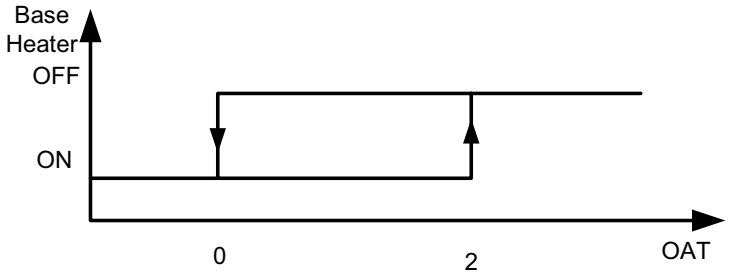
Reversing valve is on in heat mode.
Switching of RV state is done only after compressor is off for over 3 minutes.

12.1.11 Ioniser Control

Ioniser is on when unit is on ,AND indoor fan is on ,AND Ioniser power switch (on Ioniser) is on.

12.1.12 Base Heater Control

The base heater will be working only when RV is “ON” according to the following graph:



When OAT is faulty the base heater will be “ON” continuously in HEAT mode.

12.2 Fan Mode

In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the differencebetween actual room temperature and user set point temperature.

12.3 Cool Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the calculated NLOAD.

12.4 Heat Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the calculated NLOAD.

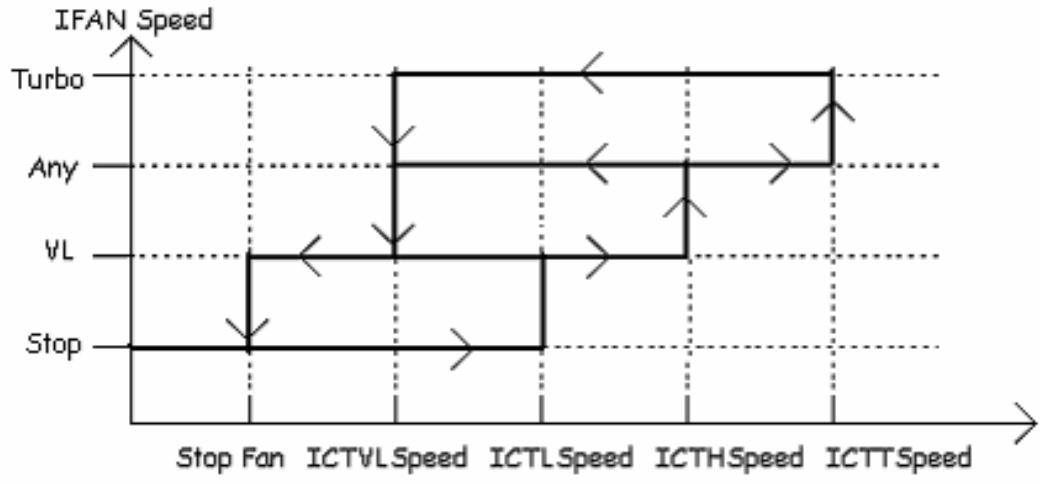
12.4.1 Temperature Compensation

In wall mounted, ducted, and cassette models, 3 degrees are reduced from room temperature reading (except when in I-Feel mode), to compensate for temperature difference between high and low areas in the heated room, and for coil heat radiation on room thermistor.
The temperature compensation can be enabled/disabled by shortening of J2 on the indoor unit Controller

Model	J2 Shorted	J2 Opened
Wall mounted	Compensation Disabled	Compensation Enabled
Cassette	Compensation Enabled	Compensation Disabled
Ducted	Compensation Enabled	Compensation Disabled
Floor/Ceiling	Compensation Disabled	Compensation Enabled

12.4.2 Indoor Fan Control in Heating Mode

Indoor fan speed depends on the indoor coil temperature:



12.5 Auto Cool/Heat Mode

When in auto cool heat mode unit will automatically select between cool and heat mode according to the difference between actual room temperature and user set point temperature (.T). Unit will switch from cool to heat when compressor is off for 3 minutes, and .T < -3.
Unit will switch from heat to cool when compressor is off for 5 minutes, and .T < -3.

12.6 Dry Mode

As long as room temperature is higher then the set point, indoor fan will work in low speed and compressor will work between 0 and *MaxNLOADIF1C* Hz.
When the room temperature is lower than the set point, compressor will be switched OFF and indoor fan will cycle 3 minutes OFF, 1 minute ON.

12.7 Protections

There are 5 protection codes.
Normal (Norm) – unit operate normally.
Stop Rise (SR) – compressor frequency can not be raised but does not have to be decreased.
HzDown1 (D1) – Compressor frequency is reduced by 2 to 5 Hz per minute.
HzDown2 (D2) – Compressor frequency is reduced by 5 to 10 Hz per minute.
Stop Compressor (SC) – Compressor is stopped.

12.7.1 Indoor Coil Defrost Protection

ICT	ICT Trend				
	Fast Increasing	Increasing	No Change	Decreasing	Fast
ICT< *-2*	SC	SC	SC	SC	SC
-2 ≤ ICT<*0*	D1	D1	D2	D2	D2
0 ≤ ICT < *2*	SR	SR	D1	D2	D2
2 ≤ ICT< *4*	SR	SR	SR	D1	D2
4 ≤ ICT < *6*	Norm	Norm	SR	SR	D1
6 ≤ ICT ≤ *8*	Norm	Norm	Norm	SR	SR
ICT> *8*			Norm		

12.7.2 Indoor Coil Overheating Protection

12.7.2.1 Indoor Coil Overheating Protection For 50/60/72Z

ICT	ICT Trend				
	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
ICT >*62*	SC	SC	SC	SC	SC
60 ≤ ICT < *62*	D1	D1	D2	D2	D2
55≤ ICT <*60*	SR	SR	D1	D2	D2
52≤ ICT < *55*	SR	SR	SR	D1	D2
48≤ ICT < *52*	Norm	Norm	SR	SR	D1
45≤ ICT ≤ *48*	Norm	Norm	Norm	SR	SR
ICT <*45*			Norm		

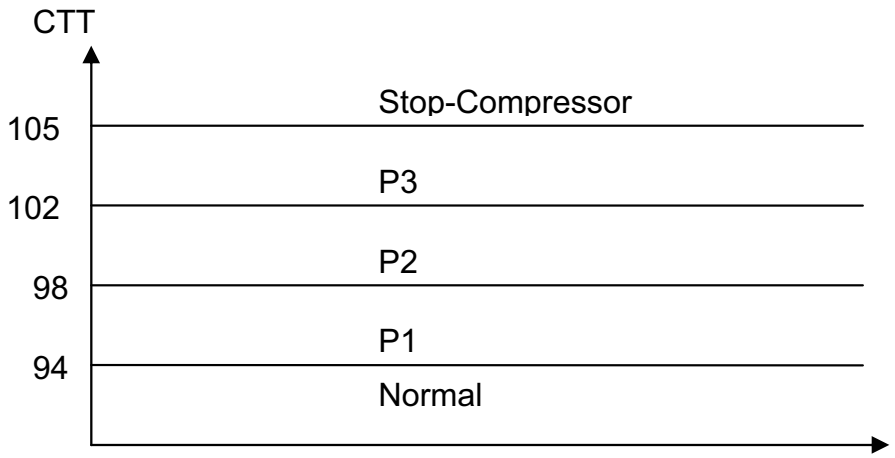
12.7.2.2 Indoor Coil Overheating Protection For 72/80

ICT	ICT Trend				
	<-2	**-2**	**-1,0,1**	**2**	**>2**
ICT >*62*	SC	SC	SC	SC	SC
60 ≤ ICT < *62*	D1	D1	D2	D2	D2
58≤ ICT <*60*	SR	SR	D1	D2	D2
56≤ ICT < *58*	SR	SR	SR	D1	D2
54≤ ICT < *56*	Norm	Norm	SR	SR	D1
52≤ ICT ≤ *54*	Norm	Norm	Norm	SR	SR
ICT <*52*	Norm				

12.7.3 Compressor Overheating Protection

12.7.3.1 Compressor Overheating Protection for DCI50/60/72Z

Compressor temperature can be in one of 5 control zones (4 in protection, and 1 normal),according to the following chart.

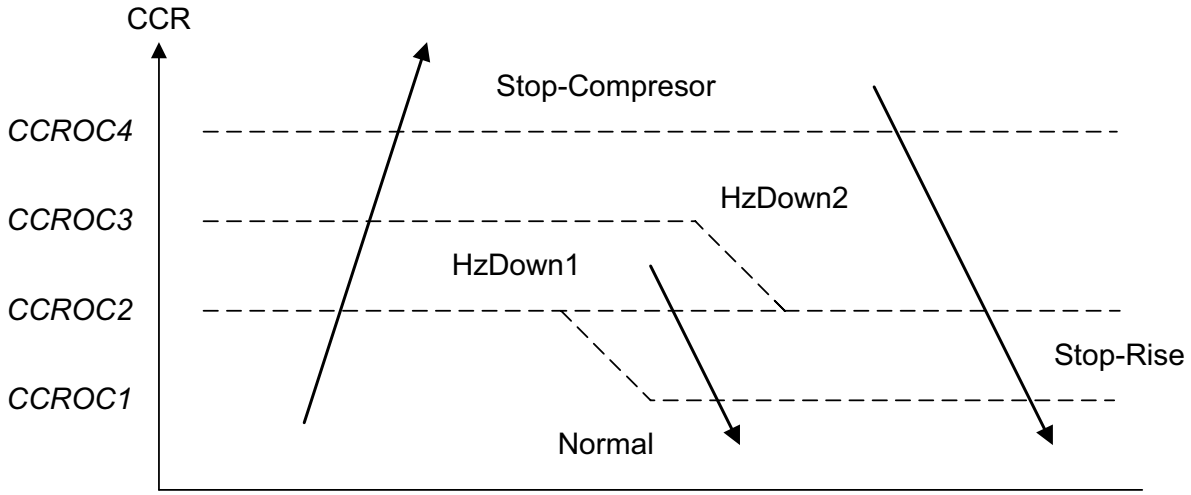


Control Status	Compressor Temperature Increases	Else
P1	Normal	Stop Rise
P2	HzDown 1	Stop Rise
P3	HzDown 2	HzDown 1
Stop Compressor	Stop Compressor	

12.7.3.2 Compressor Overheating Protection for DCI72/80

CTT		CTT Trend				
Cool	Heat	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
CTT >*105*	CTT >*105*	SC	SC	SC	SC	SC
100≤ CTT < *105*	*100*≤ CTT < *105*	D1	D1	D2	D2	D2
98≤CTT <*100*	*95*≤CTT <*100*	SR	SR	D1	D2	D2
93≤CTT < *100*	*85*≤CTT < *95*	SR	SR	SR	D1	D1
90≤CTT ≤ *93*	*80*≤CTT ≤ *85*	Norm	Norm	Norm	SR	SR
CTT <*90*	CTT <*80*	Norm				

12.7.4 Compressor Over Current Protection Only For DCI50/60/72Z



12.7.5 Heat Sink Overheating Protection

12.7.5.1 Heat Sink Overheating Protection For DCI50/60/72Z

HST	HST Trend				
	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
HST ≥ *90*	SC	SC	SC	SC	SC
85 ≤ HST < *90*	D1	D1	D2	D2	D2
82 ≤ HST < *85*	SR	SR	D1	D2	D2
80≤ HST< *82*	SR	SR	SR	D1	D1
78 ≤ HST ≤ *80*	Norm	Norm	Norm	SR	SR
HST < *78*	Norm				

12.7.5.2 Heat Sink Overheating Protection For DCI72/80

HST	Delta HST				
	<-2	**-2**	**-1,0,1**	**2**	**>2**
HST≥ *81*	SC	SC	SC	SC	SC
79 ≤ HST < *81*	D1	D1	D2	D2	D2
75 ≤ HST < *79*	SR	SR	D1	D2	D2
73≤ HST< *75*	SR	SR	SR	D1	D1
71 ≤ HST ≤ *73*	Norm	Norm	Norm	SR	SR
HST < *71*	Norm				

12.7.6 System Over Power Protection Only For DCI72/80

Power		Delta PWR				
		< -2000	***[-2000,0)***	***0***	***(0,2000]***	***> 2000***
PWR1	PWR2					
PWR ≥ *3500*	PWR ≥ *2900*	SC	SC	SC	SC	SC
3300≤PWR < *3500*	*2750*≤PWR < *2900*	D1	D1	D2	D2	D2
3100 ≤PWR < *3300*	*2600*≤PWR < *2750*	SR	SR	D1	D2	D2
3000≤PWR < *3100*	*2450*≤PWR < *2600*	SR	SR	SR	D1	D1
2950 ≤PWR ≤ *3000*	*2300* ≤PWR ≤ *2450*	Norm	Norm	Norm	SR	SR
PWR < *2950*	PWR < *2300*	Norm				

There are two sets of OVRPWR values, the selection of the values are set according to the state of the Power-Shed input.
Power-Shed input open Set values 1
Power-Shed input sort Set values 2

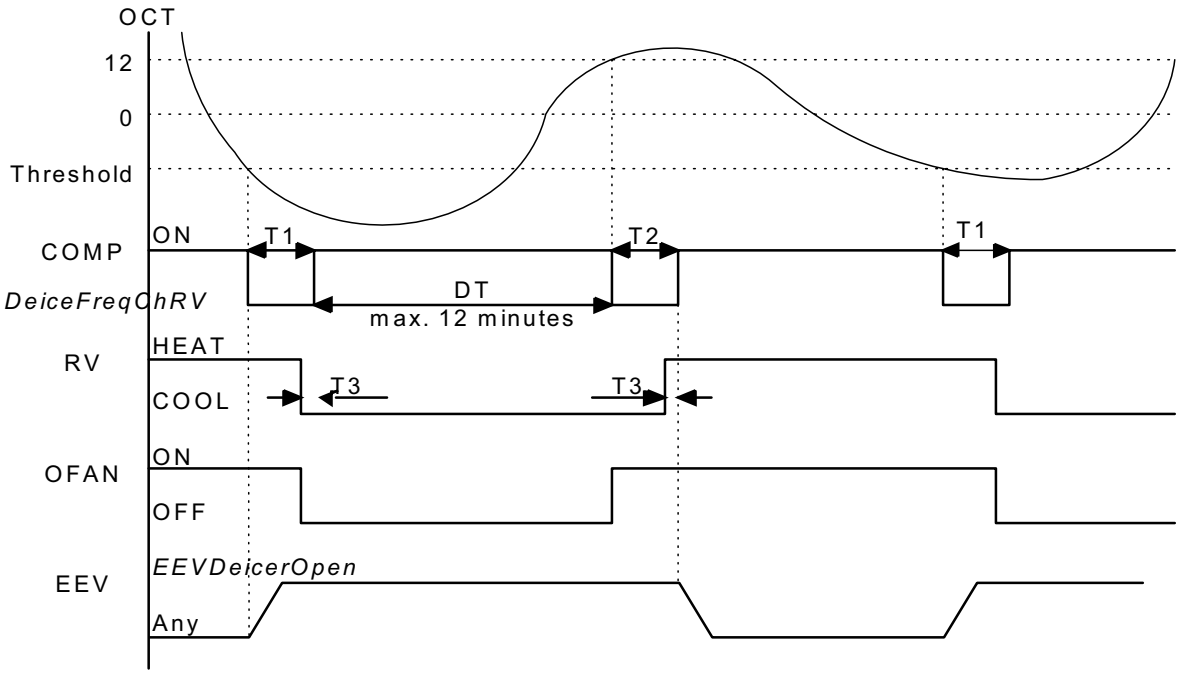
12.7.7 Outdoor Coil Deicing Protection

12.7.7.1 Outdoor coil Deicing Protection For DCI50/60/72Z

► **Entering Deicing Conditions**

Deicing operation will start when either one of the following conditions exist:
Case 1: OCT < OAT – 8 AND TLD > DI
Case 2: OCT < OAT – 12 AND TLD > 30 minutes.
Case 3: OCT is Invalid AND TLD > DI
Case 4: Unit is just switched to STBY AND OCT < OAT – 8
Case 5: NLOAD = 0 AND OCT < OAT -8
Case 6: OCT<-*19* AND TLD>*60* minutes
All this condition will exist during 10 seconds
OCT – Outdoor Coil Temperature
OAT – Outdoor Air Temperature
TLD – Time from Last Deicing
DI – Deicing Interval (Time Interval Between Two Deicing)
Deicing interval time when compressor is first started in heat mode, is 10 minutes if OCT < -2, and is 40 minutes in other cases.
Deicing interval time is changed (increased/ decreased in 10 minutes steps) as a function of deicing time. If deicing time is shorter then former deicing time, the deicing interval time will be increased. If deicing time is longer then former deicing time, the deicing interval time will be decreased.

► Deicing Operation Procedure



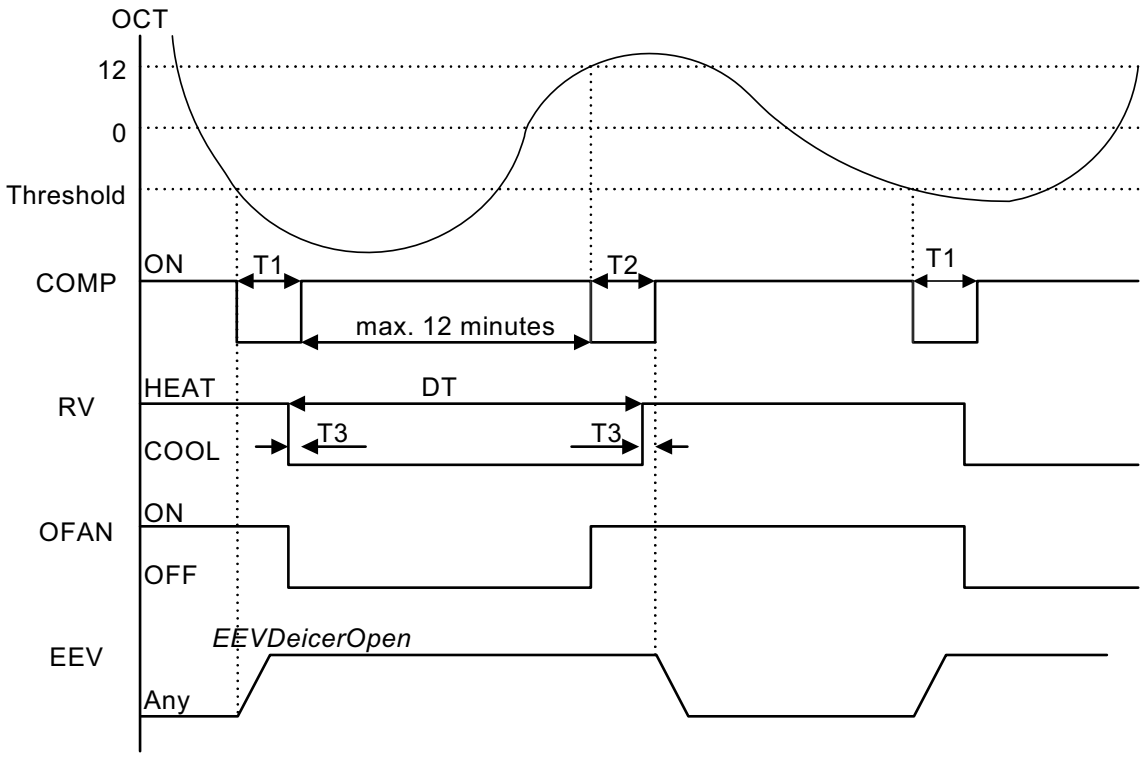
T1=60 secondes;T2=36 secondes;T3=6 secondes

12.7.7.2 Outdoor coil Deicing Protection For DCI72/80

► **Entering Deicing Conditions**

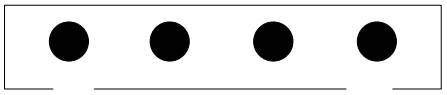
Deicing operation will start when either one of the following conditions exist:
Case 1: OCT < OAT – *8* AND TLD > *DI*
Case 2: OCT < OAT – 12 AND TLD > 30 minutes.
Case 3: OCT is Invalid AND TLD > *DI*
Case 4: Unit is just switched to STBY AND OCT < OAT – *8*
Case 5: NLOAD = 0 AND OCT < OAT - *8*
Case 6: OAT is invalid AND OCT< *8* AND TLD > *DI* AND Compressor ON Time > *15* minutes
All this condition will exist during 400 seconds
OCT – Outdoor Coil Temperature
OAT – Outdoor Air Temperature
TLD – Time from Last Deicing
DI – Deicing Interval (Time Interval between Two Deicing)
Deicing interval time when compressor is first started in heat mode, is 10 minutes if OCT < -2, and is 40 minutes in other cases.
Deicing interval time is changed (increased/ decreased in 10 minutes steps) as a function of deicing time. If deicing time is shorter then former deicing time, the deicing interval time will be increased. If deicing time is longer then former deicing time, the deicing interval time will be decreased.

► **Deicing Operation Procedure**



T1=50 secondes;T2=36 secondes;T3=6 secondes

12.7.8 Condensate Water Over Flow Protection



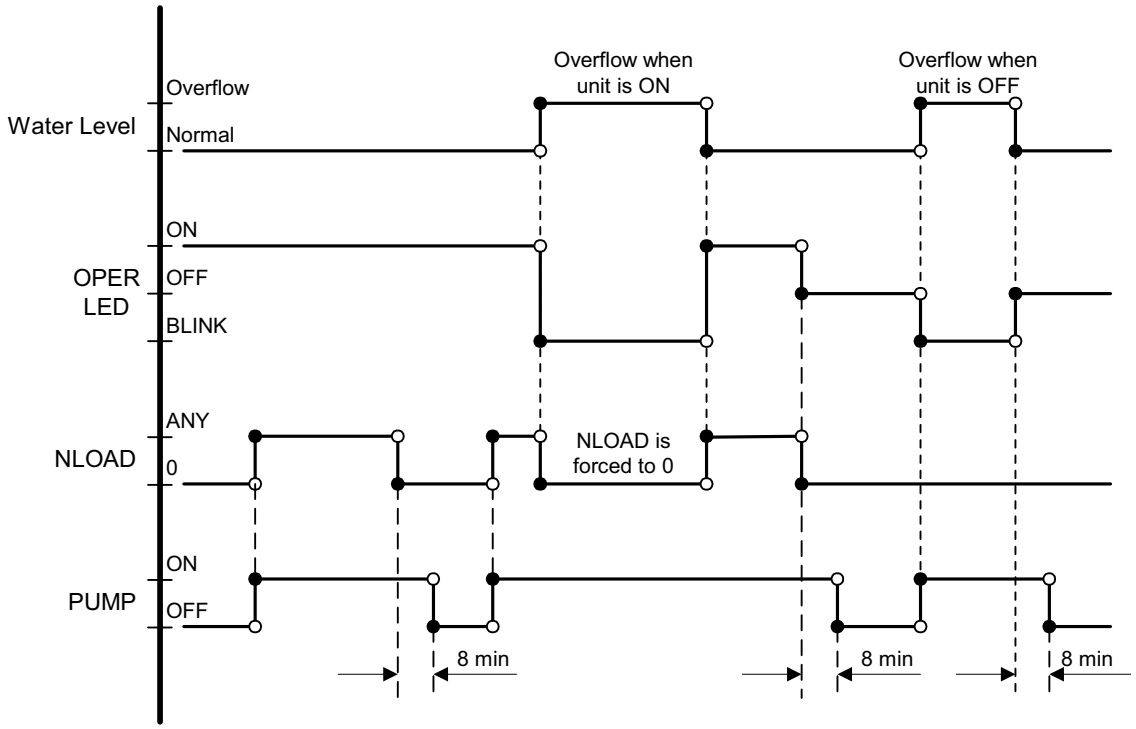
Each of the pins P1, P2, P3 can have two options:
1 – When it is shorted with P4
0 – When it is not shorted to P4

► **Water Level Protection-1 level**

P1	P2	P3	Level
Don't care	Don't care	1	Normal
Don't care	Don't care	0	Overflow

(*) 1- Pin P1, P2, or P3 is connected to P4.

0- Pin P1, P2 or P3 is not connected to P4.



12.8 Indoor Unit Dry Contact

Indoor unit Dry contact has two alternative functions that are selected by J9.

	Function	Contact=open	Contact=short
J9=open	Presence Detector Connection	No limit	Force to STBY
J9=short	Power Shedding Function	No limit	Limit NLOAD

12.9 Operating the Unit from Mode Button

Forced operation allows to start, stop and operate in Cooling or Heating, in pre-set temperature according to the following table:

Forced operation Mode	**Pre-set Temperature**
Cooling	20°C
Heating	28°C

12.10 On Unit Controls and Indicators

12.10.1 Indoor Unit controller Controls and Indicatiors for All Models Except for Floor/Ceiling model

During OFF, Fan, Cool, Heat, Dry, and Auto modes (for operation in other modes, see at the relevant spec paragraph):

STAND BY INDICATOR	1. Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands
OPERATION INDICATOR	1. Lights up during operation. 2. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. 3. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	Lights up when Air Filter needs to be cleaned.
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch on the unit.
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch on the unit.
Mode SWITCH (COOL/HEAT/OFF)	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → … In long pressing system enters diagnostic mode.
RESET / FILTER SWITCH	For short pressing: When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled. When Filter LED is off – enable/disable the buzzer announcer, if selected. In long pressing system enters set up mode (if in SB).

12.10.2 Outdoor Unit controller Indicatiors

Unit has three LED's.
SB LED is ON when power is ON (230 VAC, even when no communication).
STATUS LED is ON when COMP is ON, and Blinks according to diagnostics mode definitions when either fault or protection occurs.
FAULT LED Blinks according to diagnostics mode definitions when either fault or protection occurs.

12.11 Test Mode

12.11.1 Entering Test Mode

System can enter Test mode in two ways:
Automatically when the following conditions exists for 30 minutes continuously:
Mode = Cool, Set point = 16, Room temperature = 27(+1/–2), Outdoor temperature = 35(+2/-1)
Or
Mode = Heat, Set point = 30, Room temperature = 20±1, Outdoor temperature = 7±(+1/-2)
Manually when entering diagnostics with the following settings:
Mode = Cool, Set point = 16
Mode = Heat, Set point = 30

12.11.2 Unit Operation in Test Mode

In test mode, the unit will operate in fixed settings according to the indoor fan speed setting:

Indoor FAN Speed Setting	Unit Setting
Low	Minimum Capacity Setting
Turbo	Nominal Capacity Setting
Auto	Maximum Capacity Setting

During test mode, protections are disabled, except for stop compressor status.

12.12 SW Parameters

12.12.1 Indoor Units SW Parameters

Model dependent parametes - KN

	A (KN-60)	B (KN-72)	C (KN-80)
Cap .Group	3	4	4
NomLoadC	81	61	67
NomLoadH	77	59	67
MaxNLOADIF1C	55	44	85
MaxNLOADIF2C	70	50	102
MaxNLOADIF3C	127	120	120
MaxNLOADIF4C	127	127	127
MaxNLOADIF5C	127	127	127
MinRTC	20	20	20
MaxNLOADRTC	127	127	127
MaxNLOADIF1H	127	127	127
MaxNLOADIF2H	127	127	127
MaxNLOADIF3H	127	127	127
MaxNLOADIF4H	127	127	127
MaxNLOADIF5H	127	127	127
MaxNLOADRTH	127	127	127
MaxRTH	27	27	27
MaxNLOADPSC	81	61	67
MaxNLOADPSH	77	59	67

Model dependent parameters - DNG

Unit	A (DNG50)	B (DNG60)	C (DNG72)	D (DNG80)
Cap .Group	3	3	4	4
NomLoadC	62	77	57	60
NomLoadH	74	80	55	63
ICTSTSpeed	22	22	22	22
ICTVLSpeed	28	28	28	28
ICTLSpeed	30	30	30	30
ICTHSpeed	32	32	32	32
ICTTSpeed	40	40	40	40
MaxNLOADIF1C	50	50	63	78
MaxNLOADIF2C	63	63	85	100
MaxNLOADIF3C	120	120	115	127
MaxNLOADIF4C	127	127	127	127
MaxNLOADIF5C	127	127	127	127
MinRTC	20	20	20	20
MaxNLOADRTC	127	127	127	127
MaxNLOADIF1H	127	127	127	127
MaxNLOADIF2H	127	127	127	127
MaxNLOADIF3H	127	127	127	127
MaxNLOADIF4H	127	127	127	127
MaxNLOADIF5H	127	127	127	127
MaxNLOADRTH	127	127	127	127
MaxRTH	27	27	27	27
MaxNLOADPSC	62	77	57	60
MaxNLOADPSH	74	80	55	63

Model dependent parameters - WNG

Parameter name	(WNG) Wall Mounted Models					
	25	35	50	60	72	80
NLOAD limits as a function of selected indoor fan speed						
MaxNLOADIF1C	40	40	45	50	53	68
MaxNLOADIF2C	53	53	62	85	75	90
MaxNLOADIF3C	120	120	120	120	105	120
MaxNLOADIF4C	127	127	127	127	127	127
MaxNLOADIF5C	127	127	127	127	127	127
Indoor Fan speeds						
IFVLOWC	700	700	700	800	850	850
IFLOWC	800	800	900	1000	1000	1000
IFMEDC	900	950	1050	1100	1150	1150
IFHIGHC	1050	1100	1200	1250	1350	1300
IFTURBOC	1150	1200	1250	1300	1400	1350
IFVLOWH	700	700	700	800	900	900
IFLOWH	800	850	900	950	1050	1050
IFMEDH	950	1000	1100	1150	1200	1200
IFHIGHH	1100	1150	1250	1250	1350	1300
IFTURBOH	1200	1250	1300	1300	1400	1350

Model dependent parameters - SX

Unit	A (SX 18)	B (SX 24)	C (SX 30)
Cap .Group	3	4	4
NomLoadC	68	60	63
NomLoadH	77	60	67
MaxNLOADIF1C	40	127	127
MaxNLOADIF2C	60	127	127
MaxNLOADIF3C	90	127	127
MaxNLOADIF4C	90	127	127
MaxNLOADIF5C	90	127	127
MinRTC	20	20	20
MaxNLOADRTC	127	127	127
MaxNLOADIF1H	127	127	127
MaxNLOADIF2H	127	127	127
MaxNLOADIF3H	127	127	127
MaxNLOADIF4H	127	127	127
MaxNLOADIF5H	127	127	127
MaxNLOADRTH	127	127	127
MaxRTH	27	27	27
MaxNLOADPSC	68	60	63
MaxNLOADPSH	77	60	67

12.12.2 Outdoor Units SW Parameters:

Model dependent parameters for DCI50/60

#	Name	Single DCI-50	Single DCI 60
1	MinFreqC	20	20
2	MaxFreqC	85	95
3	MinFreqH	20	26
4	MaxFreqH	95	94
5	NormAccel	1	1
6	NormDecel	1	1
7	Step1Freq	60	60
8	Step2Freq	70	70
9	Step3Freq	90	90
10	OFVL	20	20
11	OFLOWC	60	55
12	OFMEDC	76	70
13	OFMAXC	92	79
14	OFLOWH	60	55
15	OFMEDH	83	70
16	OFMAXH	100	79
17	OFANTESTMODEC	92	83
18	OFANTESTMODEH	100	83
19	OFDelTestMode	28	28
20	CTTOH1	94	94
21	CTTOH2	98	98
22	CTTOH3	102	102
23	CTTOH4	105	105
24	CCROC1	10	11.4
25	CCROC2	10.5	11.8
26	CCROC3	10.8	12.2
27	CCROC4	11.2	12.6
28	DEICT1	60	60
29	DEICT2	36	36
30	DEICT3	6	6
31	ProtFreqLimit	60	60
32	EEVDecierOpen	100	180
33	OptimDeicFreq	90	90
34	EEVMinOperOpenC	50	80
35	EEVMaxOperOpenC	380	380
36	EEVMinOperOpenH	50	60
37	EEVMaxOperOpenH	380	300
38	EEVNormRate	33	33
39	EEVHighRate	12	12
40	EEVMaxOpen	500	500
41	OFLowFreqC	40	35
42	OFMedFreqC	70	55
43	OFLowFreqH	40	40
44	OFMedFreqH	86	60
45	HeaterDisableFlag	0	0
46	DeiceFreqChRV	0	0
47	OATRefC	35	35
48	SUCT Enable	0	0
49	HST Enable	1	1
50	OAT Enable	1	1
51	OATRefH	7	7
52	MinTargCTTC	30	30
53	MaxTargCTTC	95	90
54	MinTargCTTH	40	45
55	MaxTargCTTH	95	90
56	DST	8	8
57	DSTF	12	12
58	OATLimitC	28	28
59	OATLimit1H	6	6
60	OATLimit2H	15	15
61	MaxFreqAsOATC	64	85
62	MaxFreqAsOAT1H	85	80
63	MaxFreqAsOAT2H	60	60

Model dependent parameters for DCI72Z

No.	Name	Single DCI-72Z
1	MinFreqC	15
2	MaxFreqC	70
3	MinFreqH	15
4	MaxFreqH	90
7	Step1Freq	35
8	Step2Freq	55
9	Step3Freq	90
10	OFMinRPM	**8**
11	OFMaxRPM	90
12	NightRPM	65
13	OFNNoiseMaxRPM	78
14	CTTOH1	90
15	CTTOH2	95
16	CTTOH3	100
17	CTTOH4	105
18	CCROC1	12.5
19	CCROC2	13.3
20	CCROC3	14.1
21	CCROC4	14.9
22	ProtFreqLimit	60
23	EEVMinOperOpenC	50
24	EEVMaxOperOpenC	480
25	EEVMinOperOpenH	50
26	EEVMaxOperOpenH	480
27	HeaterDisableFlag	0
28	HST Enable	1
29	OATLimitC	24
30	OATLimit1H	6
31	OATLimit2H	15
32	MaxFreqAsOATC	60
33	MaxFreqAsOAT1H	85
34	MaxFreqAsOAT2H	75
35	NormAccel	1
36	NormDecel	1

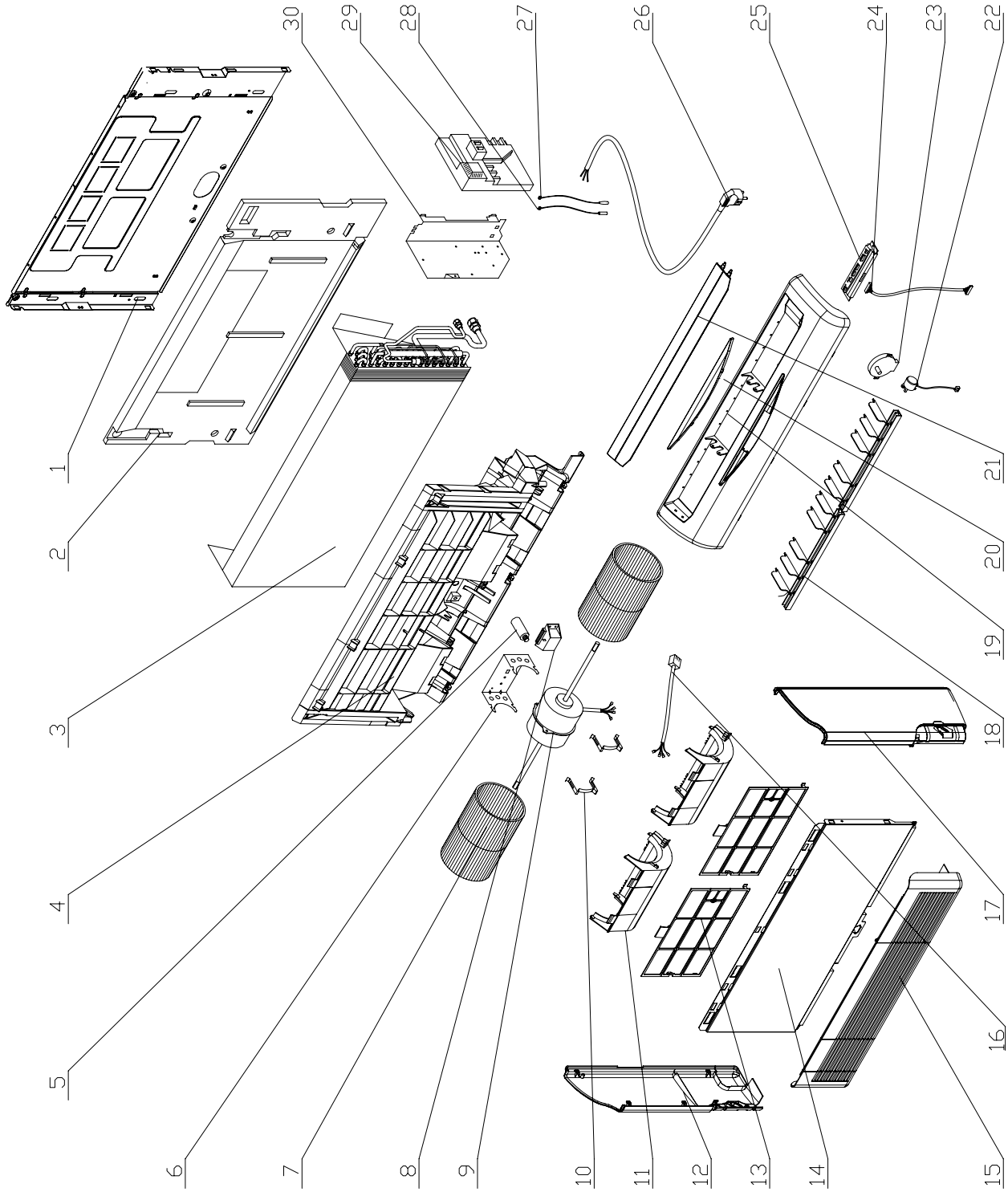
Model dependent parameters for DCI72/80

Compressor Parameters	Value
MinOFFTime	3
MinOnTime	3
MaxCTT1	90
MaxCTT2	90
MinSpeedAsCTT1	26
MinSpeedAsCTT2	26
MaxSpeedC	75
MaxSpeedH	95
Step1RPS	40
Step2RPS	60
Step3RPS	75
NormAcc (sec/RPS)	1
NormDec (sec/RPS)	1
Down1(Sec/RPS)	12
Down2 (Sec/RPS)	7
DeiceAcc (Sec/RPS)	0.2
DeiceDec (Sec/RPS)	0.5

EEV Parameters	Value
NormEEVRate	30
EEVCompOFFOpen	200
EEVCompOFFTime	60
EEVMaxOpen	500
EEVMinOperOpenC	60
EEVMaxOperOpenC	500
EEVMinOperOpenH	70
EEVMaxOperOpenH	500
EEVMinOperOpenHInIDU	60
EEVMaxOperOpenHInIDU	140
EEVIDUOFFOpen	130
EEVMoveSteps	20
EEVTConstC	30
EEVTConstH	30
BlncTimTrnsStC	1
BlncTimStdyStC	1
BlncTimTrnsStH	1
BlncTimStdyStH	1
CompOffTimToTrnsSt	20

13. EXPLODED VIEWS AND SPARE PARTS LISTS

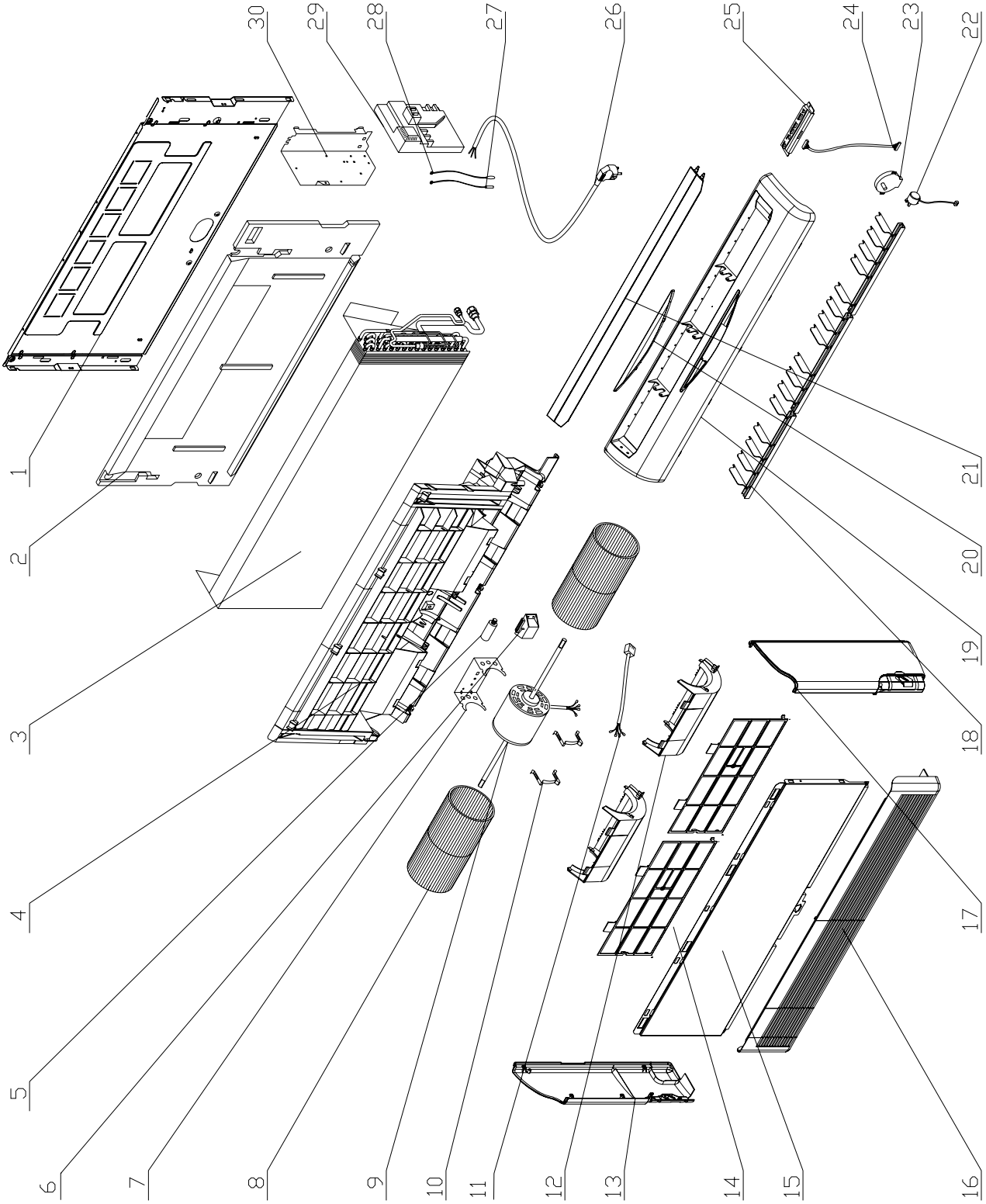
13.1 Indoor Unit: SX 9, 12 DCI



13.2 Indoor Unit: SX 9, 12 DCI

No	Part No	Description	Qty
1	307979	Back panel	1
2	382334	Base panel EPS	1
3	452731900	Evap. Assy SX25/35	1
4	373247	Fan frame	1
5	455000600	Capacitor SX25/35	1
6	323425	Motor support	1
7	293321	Centrifugal fan	2
8	452987400	Transformer for SX25/35	1
9	4520158	Motor SX25/35	1
10	4521029	Spring clip	2
11	372341	Fan cover	2
12	373245	Left panel	1
13	221555	Filter	2
14	307981	Front panel	1
15	484001	Air inlet assy	1
16	4525333	Motor connect wire for SX25/35	1
17	373244	Right panel	1
18	371257	Vertical louver	10
19	370281	Air outlet	1
20	375209-01	AIRWELL Display panel	1
	375209-05	WESPER Display panel	1
	375209-16	ELECTRA Display panel	1
	375209-17	JOHNSON Display panel	1
	4521827	GORENJEN Display panel	1
	4521831	FAGOR Display panel	1
21	372338	Horizontal louver front	1
	372339	Horizontal louver back	1
22	263034	Swing motor	1
23	436665	Stop motor	1
24	391508	Connect wire	1
25	234213	Display	1
26	391725	Power cord without plug	1
	4521070	Power cord (European plug)	1
27	438413	Room sensor	1
28	438082	Coil sensor	1
29	452935900	DCI STORM	1
30	311036	Storm panel	1

13.3 Indoor Unit: SX 18, 24, 30 DCI



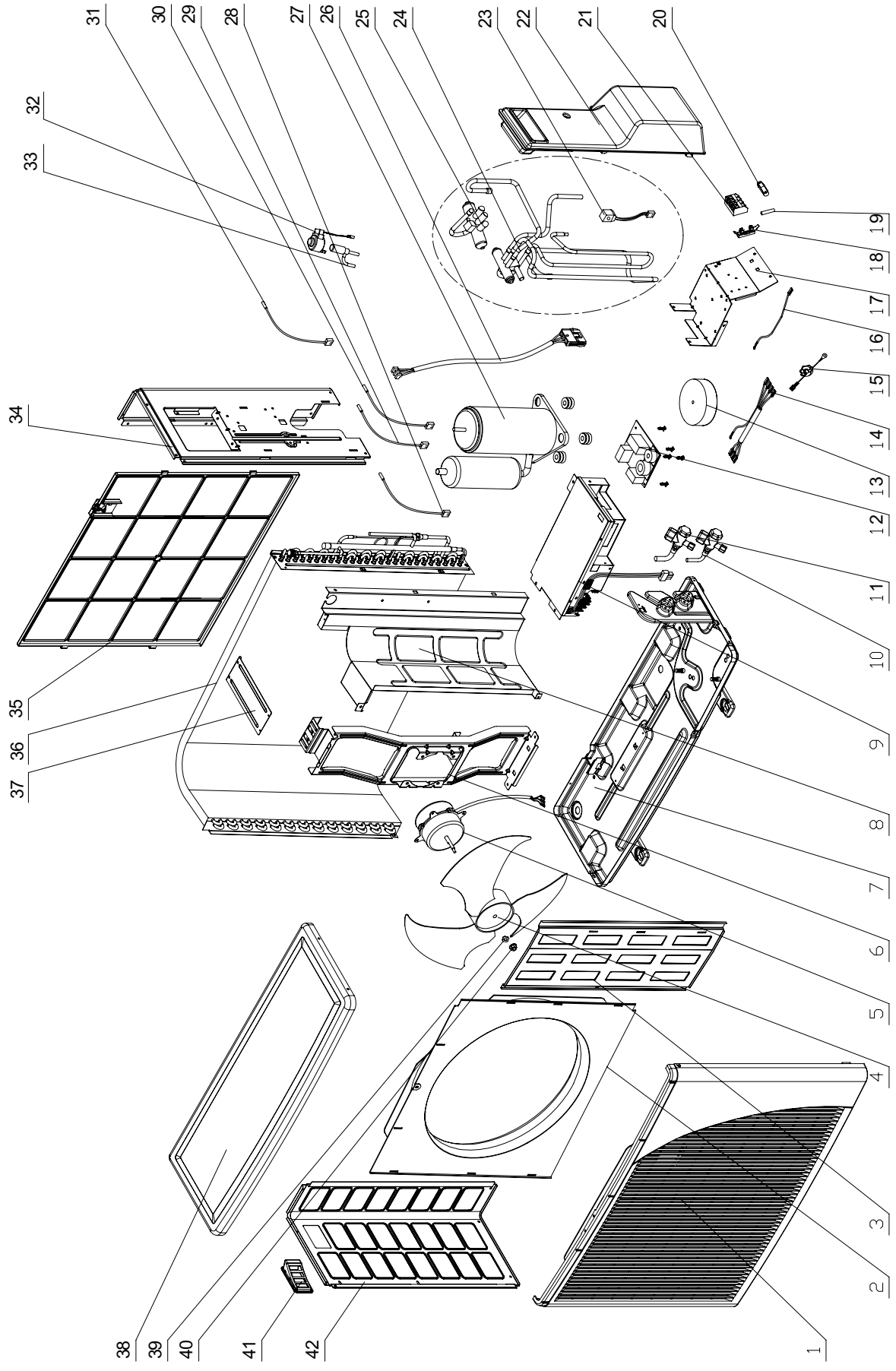
13.4 Indoor Unit: SX 18 DCI

No	Part No	Description	Qty
1	307980	Back panel	1
2	382333	Base panel EPS	1
3	4527244	Evap. Assy SX18	1
4	373246	Fan frame	1
5	455000604	Capacitor SX18	1
6	453206900	Transformer	1
7	323422	Motor support	1
8	293322	Centrifugal fan	2
9	4520931	Motor Assy SX18,24	1
10	4521029	Spring clip	2
11	4525333	Motor connect wire	1
12	372340	Fan cover	2
13	373245	Left panel	1
14	221554	Filter	2
15	307982	Front panel	1
16	484002	Air inlet assy	1
17	373244	Right panel	1
18	371257	Vertical louver	12
19	370280	Air outlet	1
20	375209-16	ELECTRA Display panel	1
21	372336	Horizontal louver front	1
	372337	Horizontal louver back	1
22	263034	Swing motor	1
23	436665	Step motor	1
24	391508	Connect wire	1
25	234213	Display	1
26	391726	Power cord 3x2.5	1
27	438082	Coil sensor	1
28	438413	Room sensor	1
29	452935900	DCI storm	1
30	311036	Storm panel	1

13.5 Indoor Unit: SX 24, 30 DCI

No.	Part No.	Description	Qty
1	484002	Grille	1
2	221554	Air Filter	2
3	373244	Right panel	1
4	307982	Frame Asy	1
5	371071-72	Display panel	1
6	470680004	Evaporator Assy	1
7	370280	Air Outlet Assy	1
8	285032	Draining Hose	1
9	372336	Horizontal louver front	1
9	372337	Horizontal louver back	1
10	371255	Vert. Louver	12
11	372340	Fan cover	1
12	293322	Fan	1
13	307980	Back panel	1
14	466236	Installation Plate	1
15	382333	Base panel EPS	1
16	466100005	Motor	1
17	323422	Motor support	1
18	436665	Step Motor	1
18	263034	Swing motor	1
20	455000603	Capacitor	1
21	234213	Display	1
22	373246	Fan frame	1
23	452935900	DCI storm	1
24	438082	Thermistor indoor coil	1
25	438413	Thermistor	1
26	311036	Storm panel	1
27	391508	DConnect wire	1
29	436609R	Remote control	1
30	373245	Left panel	1
33	4521029	Spring clip	1

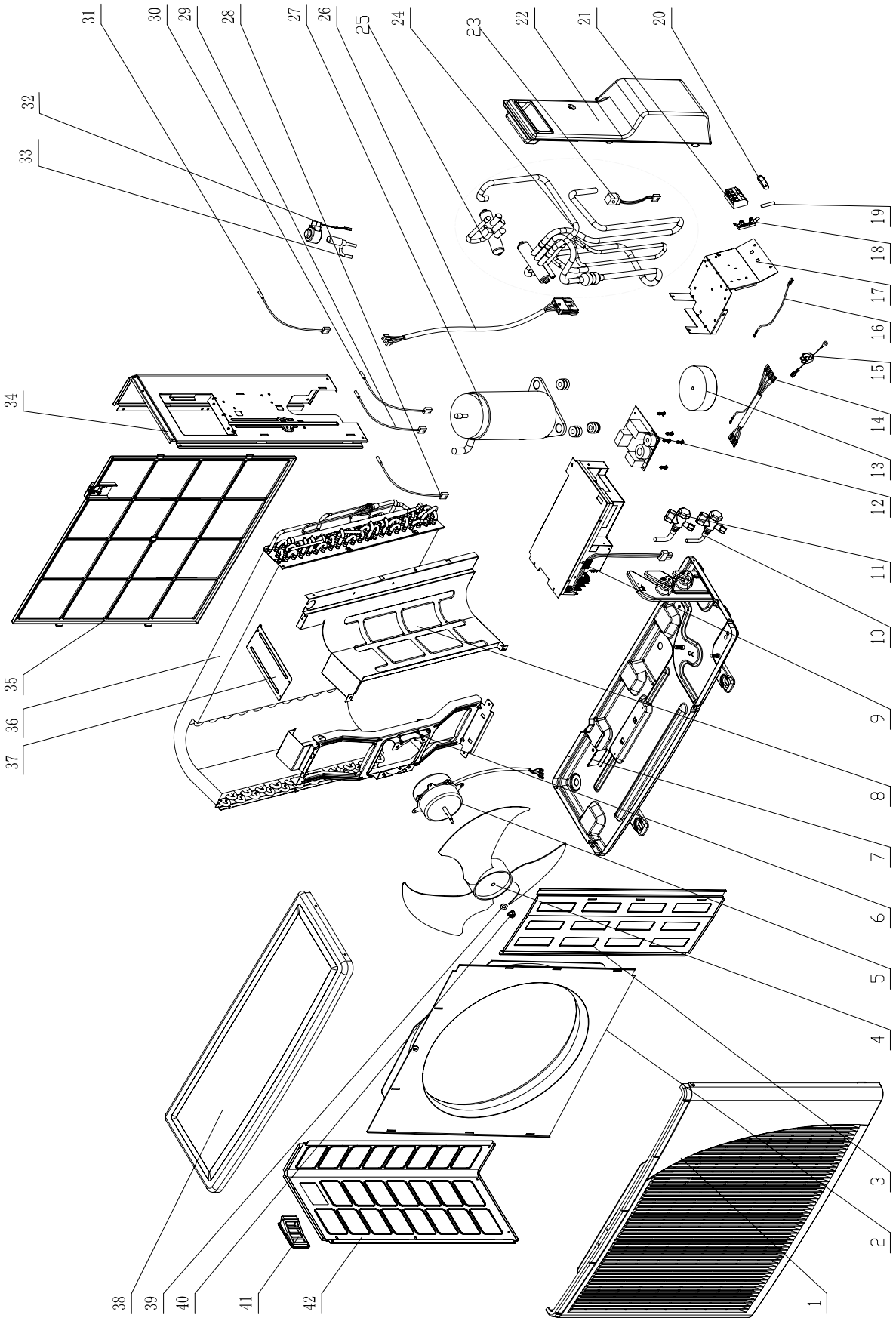
13.6 Outdoor Unit: GC 9, 12 DCI



13.7 Outdoor Unit: GC 9, 12 DCI

No.	Part No.	Description	Unit
1	433218	Front panel A	1
2	4526340	Air inlet ring-420	1
3	433223	Painting insulation plate	1
4	4526476	Axial fan OD=401	1
5	4527092	DC motor for DCI25/35	1
6	433215	Motor support	1
7	4523060	Base painting Assy.	1
8	4526299	Partition	1
9	4526403	Outdoor DC inverter controller (English)	1
10	4524177	Gas valve (R410A)	1
11	4524176	Liquid valve(R410A)	1
12	4526224	EMI fliter board 901-098-00	1
13	4526396	Chock Assy. 167-021-01	1
14	4526223	AC-IN connected wire	1
15	4526968	Earthing wire for DCI	1
16	4526222	Fuse connecting wire	1
17	4526300	Therminal sheet	1
18	4526220	Fuse stand JEF-511B(EHK P/N:150-038-00)	1
19	4526219	Fuse 65TS(15A,230)150-031-00	1
20	204107	Cable clip nylon	1
21	4519188	4 poles terminal block	1
22	433229	Value cover	1
23	4522509	4-Way valve coil	1
24	4526367	4-way valve welding Assy. (DCI25)	1
	4526393	4-way valve welding Assy. (DCI35)	1
25	4518952	4-way valve (DCI25)	1
	4518951	4-way valve (DCI35)	1
26	4526221	Compressor wire	1
27	4526204	DC Inverter compressor Assy. 5RS102XAB	1
28	4526775	Compressor top thermistor(CTT)	1
29	4526774	Outside air thermistor(OAT)	1
30	4526776	Outside coil thermistor(OCT)	1
31	4526969	Suction coil thermistor(SUCT)	1
32	4526828	EEV Coil (CAN-MD 12FKS-1 White)	1
33	4526827	Electronic expansion value (CAMB20YGFKS-1)	1
34	4519606	Right side panel	1
35	433228	Back side net	1
36	4526368	Condenser soldering assy	1
37	4526298	Bridge	1
38	4519614	Painting top cover	1
39	4526480	Gasket for axial fan	1
40	4519300	Nut M5 L	1
41	433225	Handle	1
42	4519607	Left side panel painting plate	1

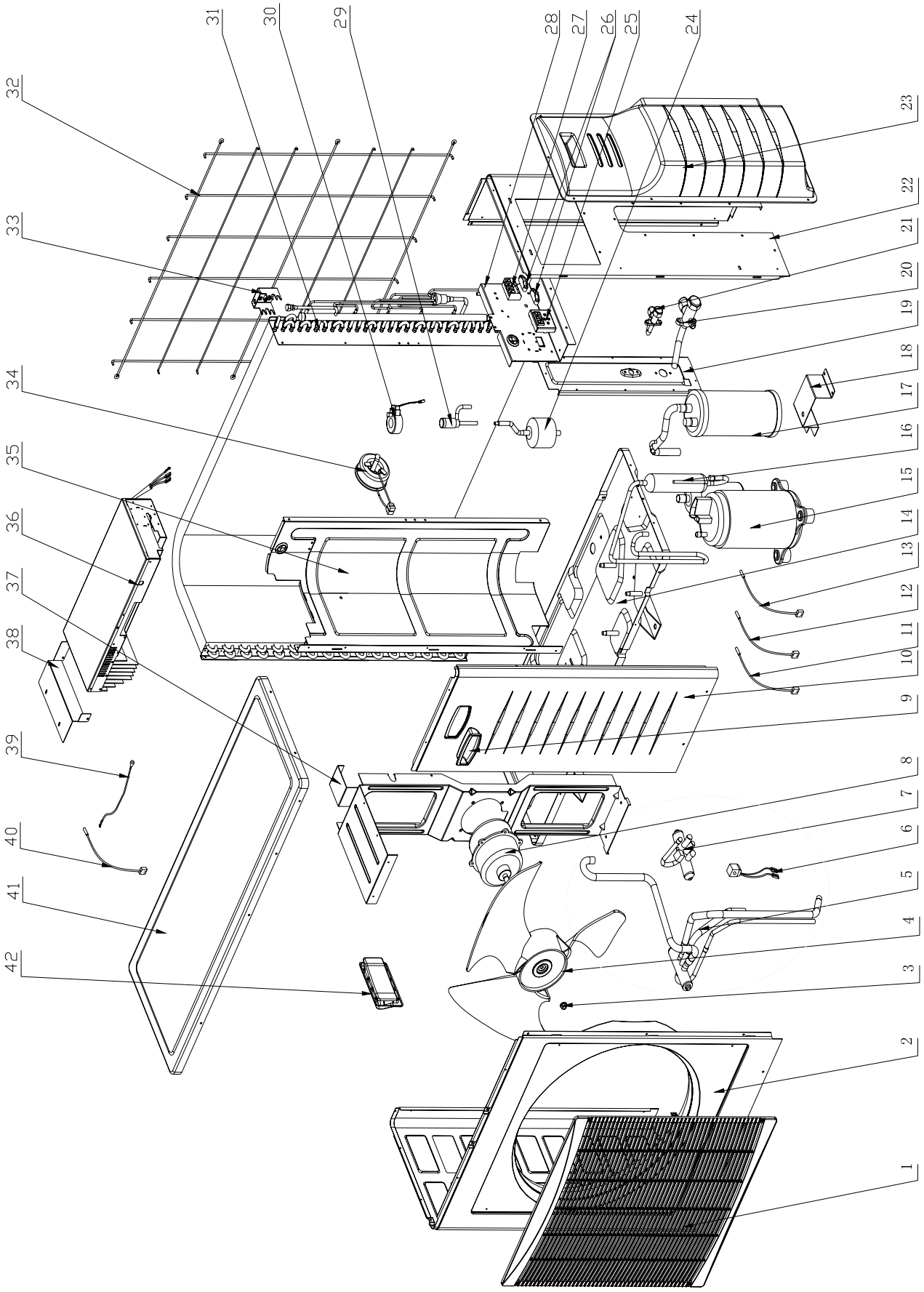
13.8 Outdoor Unit: GC 18 DCI



13.9 Outdoor Unit: GC 18 DCI

No.	Part No.	Description	Unit
1	433218	Front panel A	1
2	4526340	Air inlet ring-420	1
3	433223	Painting insulation plate	1
4	4526476	Axial fan OD=401	1
5	4526475	DC motor for DCI 50	1
6	4526457	Motor support	1
7	4527363	Base painting Assy.	1
8	4526459	Partition	1
9	4526203	Outdoor DC inverter controller (English)	1
10	4524595	Gas valve (R410A)	1
11	4524176	Liquid valve(R410A)	1
12	4526224	EMI fliter board 901-098-00	1
13	4526396	Chock Assy. 167-021-01	1
14	4526223	AC-IN connected wire	1
15	4526968	Earthing wire for DCI	1
16	4526222	Fuse connecting wire	1
17	4526300	Therminal sheet	1
18	4526220	Fuse stand JEF-511B(EHK P/N:150-038-00)	1
19	4526533	Fuse 65TS(20A,230)150-031-00	1
20	204107	Cable clip nylon	1
21	4519188	4 poles terminal block	1
22	433229	Value cover	1
23	4522509	4-Way valve coil	1
24	4527327	4-way valve welding Assy.	1
25	4518952	4-way valve	1
26	4526221	Compressor wire	1
27	4523446	DC Inverter compressor Assy. 5CS130XCC03	1
28	4526775	Compressor top thermistor(CTT)	1
29	4526774	Outside air thermistor(OAT)	1
30	4526776	Outside coil thermistor(OCT)	1
31	4526969	Suction coil thermistor(SUCT)	1
32	4526215	Electronic expansion valve ZDPF(L)-1.6C-01-RK for R410A	1
33	4526216	EEV COIL QA(L)12-HR-01A-RK	1
34	4519606	Right side panel	1
35	433228	Back side net	1
36	4526459	Condenser soldering assy	1
37	4526298	Bridge	1
38	4519614	Painting top cover	1
39	4526480	Gasket for axial fan	1
40	4519300	Nut M5 L	1
41	433225	Handle	1
42	4519607	Left side panel painting plate	1

13.10 Outdoor Unit: GC 24, 30 DCI



13.11 Outdoor Unit: GC 24, 30 DCI

No.	Part No.	Description	Unit
1	465100000	Outlet grid	1
2	4523652	PAINTED LEFT CABINET ASSY	1
3	4523758	Nut M8 left	1
4	452960400	OUTDOOR FAN	1
5	461600002	4-Way Valve Assy.	1
6	452956700	4-way valve coil	1
7	4526522	Four-Way Valve R410A	1
8	452855600	DC Resin Motor(EHD80A90EC/SIC-71FW-F170-1)	1
9	4522601	Right Handle	1
10	4523653	Painted Right Cabinet Assy.	1
11	452966200	Compressor Top Thermistor(CTT)	1
12	452956500	Suction Thermistor(SUCT)	1
13	452677601	Outdoor Coil Thermistor(OCT)	1
14	452809900	Base Plate Painting Assy.	1
15	452803300	Compressor Assy. TNB220FLBM1	1
16	452783600	Oil Separator Assy.	1
17	452783200	Liquid-Gas Separator	1
18	453256100	Support Painting Assy./Gas-Liquid Separator	1
19	4526080	Valve Plate Paint Assy.	1
20	4526513	Low Press Valve R410A	1
21	4526514	High Press Valve R410A	1
22	4523654	Painted Right Back Cabinet Assy.	1
23	4522602	Valve Cover	1
24	4518950	Filter Drier BFK-053S	1
25	467300005	Display Assy.(optional)	1
26	204107	Cable clip Nylon	2
27	467420003	7 Poles Terminal Block	1
28	453138800	Terminal Plate	1
29	4526215	Electronic Expansion Valve ZDPF(L)-1.6C-01-RK	1
30	4526216	EEV COIL QA(L)12-MD-02	1
31	462300002	Condenser Assy.	1
32	453175500	Guard Net Painting Assy.	1
33	453083800	OAT Support	1
34	453256000	Choke Assy.	1
35	452809700	Partition Plate	1
36	453170000	Controller	1
37	452888500	Motor Support	1
38	464250004	Controller Connect Plate	1
39	4526968	Grounding wire with magnetic ring	1
40	4526774	Outdoor Air Thermistor(OAT)	1
41	4523657	Painted Top Cover Assy.	1
42	4522600	Left Handle	1

APPENDIX A

INSTALLATION AND OPERATION MANUAL

- ► **OPERATION MANUAL SX 9, 12, 18, 24, 30 DCI**
- ► **INSTALLATION MANUAL SX 9, 12, 18, 24, 30 DCI**